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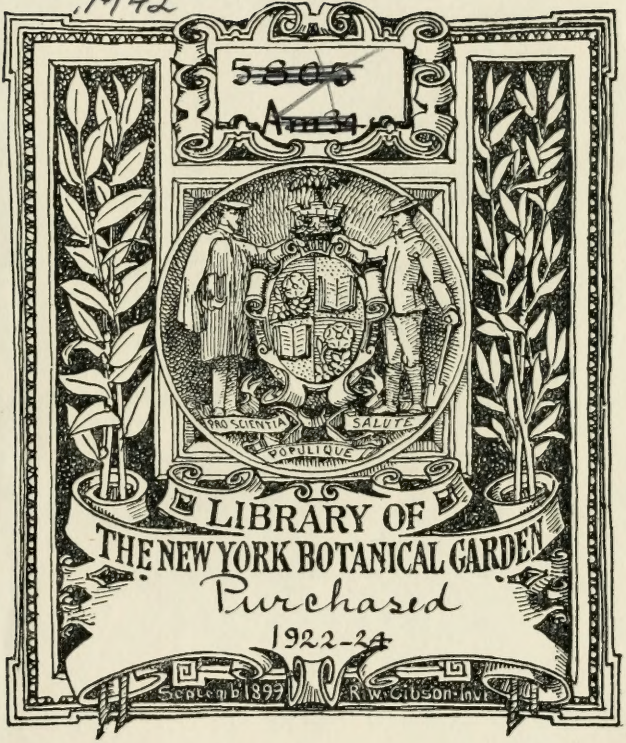
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NAVAJO EVENING PRIMROSE.—*Oenothera Clueti A. Nels.*

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THE AMERICAN BOTANIST

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Vestured and veiled with twilight
Lulled in the winter's ease,
Dim, and happy, and silent,
My garden dreams by its trees.
—*Rosamund Marriot Watson.*

OLD GARDEN FLOWERS—II

THE EVENING PRIMROSES

IT is only in some old-fashioned garden where the owner has time and inclination to bother with them that one is likely to find the evening primroses. The fact that many of them are biennial has much to do with their lack of popularity for it is not always that one cares to wait two years for the seeds he sows to produce flowers, or to make new sowings, each year, to keep up the supply of bloom. Moreover, the majority of species are, as their name indicates, evening bloomers, with their noontide of life placed at that period of the day when twilight is turning to darkness. Most of the species, however, have such cheerful and conspicuous flowers, produced through such an extended blooming season that they may be regarded as quite worth planting even if they do open only at evening. The perennial species, and especially the day blooming kinds, are, of course, among our most desirable border plants. All are easily grown from seeds.

The flowers have long been noted for opening with a celerity that makes the whole process of blooming perceptible.

Nearly all flowers open so gradually that the most careful watcher cannot say positively that he has seen the petals move but the evening primroses leave him in no such uncertainty. He may indeed be

"Startled by the leap
Of buds into ripe flowers"

as Keats expresses it. At the proper time the sepals, which during the day have covered the bud, snap directly backward in a business-like way and the sulphur-yellow petals, released from their confinement, unfold at once and seem to settle into their places with a sigh of satisfaction. The botanist, Lindley, reported that at the instant of opening, a flash of phosphorescent light may be seen, but this statement seems to need confirmation.

One of the most conspicuous examples of this rapid opening, because of the size of the blossoms, is found in the Navajo evening primrose, illustrated in our frontispiece. In summer the first flowers begin to open about twenty minutes of eight and the blooming proceeds so rapidly that one can see, not a single blossom opening, but a whole bush bursting into bloom. One is reminded of the way umbrellas begin to appear in a crowd when a threatened shower begins to descend. In ten minutes seventy-five flowers may open on a single plant. The flowers in all the species are arranged in an indeterminate inflorescence, two or three blossoms in the axil of each leaf and though they open for only a single day—or night—there are always one or two mature buds waiting to replace them at the next dawn or dusk.

The first flowers have scarcely spread before the hawk-moths find it out. Attracted by the nectar they flock to the flowers and for an hour or more are very busy; so busy, in fact, that they pay no attention to human observers provided

CHEERFUL AND CONSPICUOUS FLOWERS

they do not move suddenly. They will even visit, without a sign of fear, flowers detached from the plant and held in the hand. As the twilight deepens one may throw a beam of light on flower and moth and study both at close range. Margaret Deland has referred to the friendship of flower and insect in the lines

"And there the primrose stands, that as the night
Begins to gather and the dews to fall,
Flings wide to circling moths her twisted buds
That shine like moons with pale cold glow."

Some interesting experiments were made with the flowers of the species previously mentioned to discover what stimulus it is that causes the flowers to open and close. Two buds picked a few minutes before the opening time and placed in water close to a bright light remained closed but when one bud was shaded it immediately opened. The other continued closed until it, too, was placed in darkness. Still other blossoms placed in a cool, dark cellar remained open for more

than three days with a life-span thrice that of their companions in the garden. Lack of time prevented experiments to decide whether heat or light has the greater effect on their closing, but from the fact that, late in the summer, the flowers do not close during the day and are no longer true evening primroses, it may be inferred that temperature rather than light may be the cause. Though there are times when the flowers remain open in the light, they are nevertheless true to their first instincts in opening first at dusk.

The evening primroses are all very much alike in cultural requirements. They are dry ground plants, often very abundant in desert regions, but almost any garden soil will suit them. Though often blooming at night, they prefer sunny situations. Our commonest species (*Oenothera biennis*) is a frequent weed in gardens but some forms of it are sufficiently attractive to be cultivated, and occasionally they are fragrant. This species, or a closely related form, is of more than ordinary interest because of the fact that from it De Vries obtained some of the best proofs of his Mutation Theory which in some respects modifies the well-known Darwinian Theory of the origin of species. The particular form he worked with is known as *O. Lamarkiana,* or occasionally it is called the variety *grandiflora* of *O. biennis.*

The finest day blooming species of the group is probably *O. speciosa,* a plant with large satiny-white flowers. The best yellow sort is said to be *O. Missouriensis* a trailer with flowers often five inches across. The yellow-flowered form oftenest cultivated in the gardens is *O. fruticosa* variety *Youngii,* which is usually called *O. Youngii* in the catalogues. Another white-flowered day-blooming form is *O. pallida.* This opens in the early morning and late in the day turns to a deep pink. Best of all it is a perrennial and in time forms

attractive little colonies. *Oenothera glauca* var. *Fraseri* (*O. Fraseri* of the catalogues) is much like it in size and shape but does not turn pink with age. It is, moreover, a bad weed in some gardens, spreading so rapidly by underground runners that it may easily become a pest. It should be planted only in places where its spreading cannot crowd more desirable plants. The Navajo primrose (*O. Clutei*) is among the finest of those that open in the early evening. The flowers are often more than four inches across, of a clear sulphur yellow and borne in great profusion.

PACHYLOPHUS

Related to the evening primroses, and often classed with them, are certain plants often placed in the genus *Pachylophus*. These are acaulescent plants with rosettes of toothed leaves, resembling those of the dandelion, from the center of which spring several pure white flowers more than six inches long and three wide. These open in the early evening and by the next morning have turned pink. After the plant be-

gins to bloom it produces from one to six flowers every evening throughout the summer. It is a very handsome and attractive species.

There are probably a hundred species of evening primroses. Nurserymen and gardeners incline to place all these in the genus *Oenothera*, but botanists, noting small differences in the flowers, have at times made several smaller divisions with such, generic names as *Kneiffia, Onagra, Levauxia Hartmannia,* etc. Most of the species are North American, and all could probably be greatly improved by cultivation. Practically the only claims they have to our attention are their beauty anl interesting habits, though the root of our common species is sometimes eaten in Europe and is said to have a flavor like that of oyster plant.

FLORA OF THE MICHIGAN SAND DUNES

By Mary Earle Hardy

IT is a surprise on digging into the dunes to find so much moisture under the surface of the sand, and that streams trickle, and ponds and marshes lie, in the hollows among the hills. The wide stretches of dune marshes are another surprise and their beauty is beyond expression.

We wonder that any plant dares attempt a settlement where mountains of sand are carried by the winds; where deserts stretch farther than the eye can see. Yet plants are full of courage. The dunes are battle-grounds and the student comes upon many a hero-tale among the trees and other plants of our Lake Michigan areas of driven sands.

Close to the water's are the "wave-tormented sands"

though if we were wiser we might change our phraseology seeing how the gray, glittering strand laughs in the sun. Here no plant can live. Next are the driving sands which are the sport of the winds, and these gradually merge into the stationary dunes which have been battle-grounds for ages and ages, and where plants are at last victorious. Often in these battles between vegetation and the driving sands, a little bunch of dune-grass has turned the tide in favor of the plants. Dune-grass has winged seeds, is quick of growth, and a rapid colonizer. It binds the sands with its tangle of roots, catches other seeds, twigs, and leaves, and little by little forms a humus and the storm-tossed dune becomes a place of plants and a hill of trees.

Aside from the wonder that plants ever make settlements on the dunes, is the added surprise of finding desert and arctic plants in close companionship, along with those of woodland, prairie,and marsh. This is said to be the case with no other known region of the United States. In consequence of this, the dunes become wild gardens of especial interest to botanists.

The prickly pear cactus luxuriates in the dune sand and sprawling in thorny patches bears its flaming yellow flowers as freely as in its desert habitat, while twin-flowers nearby, are as delicate as their cousins above the Arctic Circle. Direct descendants of trees that grew in the hot Carboniferous age, now dwarfed to delicate herbage, fringe the sands over which trail the long runners of the uva-ursi—a lovely wanderer from the Arctic regions. Over them wave and bloom the slender shad-trees which Matthews, in his book on trees, tells us came down from the North with the glaciers. Sheltered by the pines and oaks, whole hillsides are covered with trailing arbutus—the Pilgrim's flower.

On the southern shore of Lake Michigan, in the very shadow of Mount Tom— a sand-dune one hundred and ninety-two feet high—is a ten-acre tamarack swamp where tasseled trees stand close together with water-loving ferns between. The fronds of the ferns reach to the height of a man's shoulder and little starry blossoms, that love to stand in water, hide among them and wear their jewels of dew.

Lupines flourish in the sand and acres are blue with their blossoms while their long ramifying roots are sewing the sands into solidity. On the steep dune banks I have found wild lilies and delicate hair-bells, swept by storms of wind that wear rocks like a graving tool, but the flowers were as beautiful and care-free, as if lifting censors and swinging bells before the face of God—and who can say they were not?

This is near the southern limit of the jack-pine and against their green, fire-weeds blaze, phloxes wave, and columbines weave their charm. "Rosy mound" is a dune at the lower extremity of the region, crowned with wild roses which are themselves thornless. Out of apparently desert sand spring four kinds of lady-slippers.

Masses of marsh-marigolds—called by an Indian name which means "to light up the swamp"—are like patches of sunshine, as are also the brilliant yellow flowers of the puccoon—another Indian name whose significance we wish we knew. The tall milkweed stalks—and they grow very tall and abundant in the sand—may seem in the twilight to be the shades of tall Pottawattami sachems who still keep guard over their ancient hunting grounds.

The bogs and marshes among the dunes are an especial part of dune-land. Imagine if you can the sweep of a dune marsh in May or June when acres upon acres are lit with the sky color of millions of wild iris flowers. And in autumn the

same marshes, as far as the eye can reach, are darkly blue with the flowers of closed gentians or ablaze with cardinal flowers.

Like the desert in general the flora of the dunes is of great brilliancy. I have only given a few imperfect glimmpses of the wonderful flora of a wonderful region. Those who love the dunes will tramp over them all day with shoes full of sand but with hearts full of delight, while others not in the "cult" may curse the dunes—and miss a blessing!

THE TURTLE MOUNTAINS OF NORTH DAKOTA

By O. A. Stevens

TO the average "tenderfoot" in North Dakota, the name Turtle Mountains is of special interest, particularly if his view of the state be limited to the famous valley of the Red River of the North. He is thankful to be assured that somewhere in the state there must be more varied typography, something different from this level receding horizon, broken here and there by a cottonwood grove, something to interrupt the convergent pair of slender lines which represent the indispensable railway.

Perhaps his recollections of geography fail to include mountain ranges in North Dakota, but even so, there may have been some thought unworthy of inclusion in some little known spot in the great west. The older resident is likely to inform him that the Turtle Mountains will disappoint him. As mountains, this is quite probable, but as an interesting dot on the Great Plains, a brief description may be of interest to our readers.

Geologically this area is said to have been once a part of the Missouri Plateau, becoming separated by long processes of erosion until it remained an island as it were, some distance from similar formations. In the glacial period the top was more or less smoothed off and a moranic covering of 10 to 200 feet left upon it.

Geographically, the "mountains" form a spot about 40 by 25 miles astride the Canadian boundary nearly midway of the length of the state. Three branches of the Great Northern Railway touch them, one at St. John on the eastern end, one at Bottineau on the southwest, and the third having its terminus at Dunseith on the south. Traveling on the so-called "wheat-line" of the "Soo" the hills are usually in view in the distance from Bisbee to Omaha. The writer's observations are from three brief trips in the vicinity of Bottineau.

The elevation of the "mountains" is 400 to 600 feet above the surrounding plain. Thus they fall considerably short of the 1000 feet necessary to qualify in the mountain class. Locally they are spoken of as "the hills." The surface, like that of other glaciated hills, is a succession of low rounded hills with intervening depressions of sizes ranging from mere potholes to quite respectable small lakes. Naturally wooded, the larger timber was early removed, and in later years much has been cleared for farming. The woods now standing are composed largely of aspen and balsam poplar (*Populus tremuloides* and *P. balsamifera*) of a foot or less in diameter. In other places ash and elm (*Fraxinus lanceolata* and *Ulmus americana*) are common while birch (*Betula papyrifera*) is frequent in suitable locations. The more open spaces are quite densely covered with shrubs, chiefly willow, dogwood, hazel wild-rose, June-berry and choke-cherry.

ALONG THE MARGIN OF THE LAKE

Lake Metigoshe, lying partly across the international boundary, provides about twelve miles north of Bottineau, a summer resort of no small importance to the surrounding country. The writer spent one Sunday (July 7, 1917) collecting near the road about half way between Bottineau and the lake. This had been graded recently, furnishing a good road through the hills. In the small hours of the morning autos began to pass on their way from the surrounding country and neigboring towns to spend the day at the lake. During the day there was scarcely a time when the hum of passing cars was absent.

This road provides an interesting cross section of the "mountains." For some three miles from Bottineau it crosses a level plain, the floor of glacial Lake Souris. Then by a gradual winding incline, it mounts some of the lower hills and continues northward toward the lake. At one point it crosses a high broad hill from which a considerable veiw of the surrounding country is obtained but most of the way it winds between the ponds and up and down over the lower hills. Approaching the lake a detour is made around one end.

and then it winds through the woods down to a point which nearly divides the water. At the end of this point a bridge has been constructed making it possible to return on the other side.

Driving over the same way on July 6, 1920, recent rains had brought the vegetation into superb condition, and the roadside was decorated with brilliant masses of flowers, most conspicuous of which were the roses and vetches (*Lathyrus venosus* and *Vicia Americana*). Some of the dark red roses were the most handsome I have seen, and the *Lathyrus venosus* is a truly beautiful and characteristic plant. The late Dr. Lunell, an ardent champion of wild flowers, has described (Am. Mid. Nat. 4:431) as the most beautiful display he had ever seen a whole acre of this plant.

It seems strange that this attractive flower has not received a distinctive common name, but none has come to the writer's notice. "Wild sweet pea" is made to serve for nearly any native legume, the flower of which attains an appreciable size regardless of odor, or simply "wild pea", which applies equally well to some hundreds of plants. I have therefor proposd (Am. Mid. Nat. 7:92) "bushy vetch", a name suggested on this very trip by the ease with which it grows upright, seemingly alone, but slightly supported by small shrubs or other plants. Perhaps it may be permissable to interpret the name as referring also to its characteristic habit of growing among such plants. Growing in the open, the stems stand erect to a height of a foot or more, but where somewhat protected, clasping the finger of a neighbor, it readily reaches three or four feet and extends its dense clusters of large purple flowers. The more slender wild vetch is somewhat overshadowed, but is an ardent ally rather than competitor.

As one follows the curves of the road various types of vegetation are presented by the ever-changing contour of the ground. Some of the hills are yet covered with poplar, others have been cleared for farming. Slopes cleared of timber, still have a covering of wolf berry (*Symphoricarpos occidentalis*) and coarse herbs with occasional larger shrubs. Especially where the hillside has been cut away for the road the dogbane (*Apocynum androsaemifolium*) spreads its branches displying its pretty little pink bells. The smaller depressions are filled with sedges and grasses, somtimes with a starry cover of fleabane (*Erigeron philadelphicus*).

The subsidence of a once larger lake has left a low ridge dividing two lakes (or are they ponds) and along this runs the road. The higher part of this ridge is a favorable place for the vetches, and occasional larger shrubs, cow parsnips (*Heracleum lanatum*), or other coarse herbs rise above the wolf berry. Coming down the hill and on the ridge, the trees give way allowing a glimpse of the lake. Some places are bordered with bulrushes from which come the sounds of coot and duck, while terns and gulls hover over the water.

The photo shows a view along the margin of one of the larger of these little lakes along the road. In the distance is the tree-covered hillside. To the left the road skirts the lake, rising slowly, then turning sharply to mount the hill. In front stretches an expanse of shore left by the retreating lake, and this displays a striking zonation. Behind the bare margin for a few feet is little but *Ranunculus sceleratus* and *Rumex persicarioides;* then scattered among these a band of tall *Senecio palustris* in full flower. Behind this, bulrushes (*Scirpus validus*) which in turn give way to a mixture of horsetail and fleabane (*Equisetum hyemale* and *Erigeron philadelphicus*). Further, are grasses and sedges, with some reeds

(*Phragmites*) and Joe-pye weed (*Eupatorium purpureum*), near the foot of the hill which is covered with the coarse herbs and shrubs. Around a near-by lake the *Senecio* was even more conspicuous, forming a brilliant golden band encircling it.

The woodland flora is mainly that of the more eastern deciduous forest as for example wild sarsaparilla (*Aralia nudicaulis*) which is abundant, but a straggler from the north is found in *Achillea multiflora*. A few other such occur. A leafy stemmed loco (*Oxytropis deflexus*) is abundant along the gravelly shore near the summer resort, and another species (*O. splendens*) occurs on some of the grassy hilltops. *Cornus canadensis, Lepargyrea candensis, Anemone hudsoniana, Geranium bicknellii, Polygala senega, Pyrola asarifolia, Ribes triste, Senecio eremophilus* and *Avena Torreyi* are mostly limited to this part of the state, while the beaked hazel (*Corylus rostrata*) is the common one there.

Weeds are not absent. The dragonhead (*Dracocephalum parviflorum*) which is so at home near the woods, is common. False flax (*Camelina sativa*) seemed especially common along the road, and Canadian thistle (*Carduus arvensis*) was seen around the edges of nearly every pond. Apparently the seeds had blown into the water, and cast upon the shore had found a congenial habitat. By the same way has come the more recent pest, perennial thistle (*Sonchus arvensis.*)

BOTANY FOR BEGINNERS

By Willard N. Clute

THE young lady who said she liked everything about plants except botany expressed the sentiments of a great many people. We admire the brilliant colors and graceful forms of the flowers, we ornament our grounds and decorate our dwellings with the finest specimens, we use them in quantity for all sorts of festive occasions, and most of us realize that we depend upon vegetation for food, shelter and clothing, but when it comes to the science of plants, we too often regard it as concerned primarily with a multitude of uncouth and outlandish terms quite detached from the plants themselves and of no use to anybody except a few peculiar individuals who happen to like that sort of thing. This opinion is one that the scientist himself often unconsciously fosters, for his life in herbarium, classroom or laboratory inclines him to exalt book knowledge and indoor studies above a familiarity with plants in the field. "Where have you been" asks the prim and severe tutor of her youthful charge. "Out in the garden watching a rose unfold" replies the child. "Well, don't you know you ought to have been in here studying your botany lesson?" inquires the conscientious but purblind teacher.

The world has long poked fun at its conception of the botanist whom it usually represents as an amiable elderly gentleman, armed with vasculum, trowel, manual and lens, wandering about the fields, peering at small flowers through his glass, and so intent upon his hobby as to be oblivious of everthing else. Doubtless such specimens exist but they are always so rare as to cause comment. As a matter of fact

everything that concerns plants belongs to botany. Even the succesful farmer must be a good botanist though few things would surprise him more than to be told so. It is not a familiarity with, and use of technical terms that makes the true scientist; it is an understanding of, and love for, the plants themselves. It is very clear, therefore, that more botanists are roaming the countryside nowdays than are numbered on the rolls of the botanical societies.

The students of an earlier day were nearly all field botanists, attracted to the study by the beauty and marvellous structure of their specimens. Often they pursued their studies far beyond the bounds of civilization and under the greatest difficulties, sustained in the work by the pleasure derived from a discovery of the unknown, whether this happened to be an unknown species or an unknown fact. Probably a majority of such students were enthusiasts who found in botany only an avocation that might be followed in spare moments snatched from the daily grind of business and on Sundays and other holidays. Those were the days in which the professional botanist scarcely existed and the study was alluded to as the "amiable science." The modern college-bred, closet scientist has exchanged his vasculum and trowel for forceps and scalpel, and with his lens, now grown up into a microscope, studies not plants, nor even *a* plant, but parts of a plant. He usually looks with some contempt upon the collector and namer of plants, but there is still much to be said in favor of such studies, not the least of which is that this phase of the subject is the one that appeals most strongly to the common people.

Pretty nearly everybody is interested in field botany. I have known farmers, business-men, common laborers, housekeepers, fishermen, hunters—even cowboys and Indian trad-

ers—to leave their regular tasks and wander over hill and dale in search of plants when they were accompanied by somebody who could talk about them. Indeed, I suspect that a great part of the fishing and hunting that goes on in settled communities is made the subtile excuse for getting away again for a day among the plants. It is the custom of the ordinary man to suggest some ulterior motive for a return to nature, just as he borrows a child to take to the circus, or takes the children to the woods in spring. Deliberately to go flower-gathering would seem to the average adult much too sentimental to be countenanced.

An interest in plants, moreover, is the compelling factor in a multitude of diverse undertakings quite unbotanical in character. No matter how much the driver is interested in the speed of his car he at least chooses the more flowery and tree-shaded highways when he drives for pleasure. And those peripatetic gentlemen of the road whose sole artificial method of transportation is an empty box-car—where do they establish their camps? Always among sheltering trees if there are any in the neighborhood! The wanderlust that inspires such travellers is undoubtedly in part a response to the changes of vegetation, for like the birds, they go south when the leaves fall and are always rarest where plants are fewest. There are no tramps in the desert!

Much of the charm of bird-study is really due to the plants among which it is carried on. The bobolink's song sounds less sweet if separated from the flowery meadows over which he hovers and sings, as many a man has discovered to his sorrow after caging the bird. The whistle of the oriole from the airy branches of an elm, the mew of the cat-bird in the dewy alder thicket, the robin's song in the orchard, even the caw of the crow among the pines, is more musical because

of its plant associations. It is not surprising, then, to learn that many of the eminent botanists of the present generation trace their interest in plants to the time when, as bird students, they wandered in field and wood. One might go still further and point to the fact that the birds themselves, are good botanists. They know which species produce the edible fruits and their judgement in the matter of nesting materials and the most satisfactory locations for summer residences cannot be questioned. The wood pewee, the humming-bird and various others are great students of bark patterns and lichen decorations and reproduce them in the ornamentation of their nests. Even stranger than this some birds are known to regularly decorate their nests with fresh flowers. The purple martin is as fond of peach blossoms as the Japanese are of their cherry blossoms.

There are, of course, a few individuals—those who regard themselves as hard-head business-men or professional scientists—who would almost as soon be caught robbing a church as gathering flowers, but even these have, perhaps far beneath the surface, an interest in plants. They are not averse to going berrying, or nutting, or hunting bee-trees or gathering mushrooms. To such, the virtues of wintergreen and birch and sassafras and slippery elm and ginseng may be matters of importance and though they disclaim an interest in plants they commonly pay homage to vegetation in general by spending at least two weeks of every year in a wilderness of plants.

The automobile has done much to reduce the number of those who would ordinariiy take up the study of plants. I do not now allude to the important part it plays in reducing the total of the population, but to the fact that it is so much easier and less dangerous to ride than to walk that we natur-

ally choose the more rapid method of transportation. One can have a rattling good time in the cheapest of automobiles! It is, however, difficult to stop when one once gets started. Even at ordinary speeds, the flowers trail past as mere blobs of color in the landscape and one hesitates to check the driver in his flight lest the other members of the party be annoyed. The only practicable way to study plants is on foot, though the auto need not be disdained as a means of reaching the spot where the real journey is to begin. There is much to be said, however, in favor of entire journeys afoot and I am gratified to note that the number who agree with this opinion seems to be increasing.

There is a special delight in making short cuts across fields, following the brooks, or sauntering along country byways where the automobile cannot go. One sees so many things that are hidden from those who must keep to the highways. It is difficult, I confess, to get the average automobile driver to appreciate this point of view. That anybody should actually prefer to walk when he can ride is incomprehensible to him. It is one of the commonest experiences of the botanizer to be offered a lift to the nearest town by well-intentioned autoists, but the wise student knows very well that one cannot successfully pursue plants with any combination of iron, rubber and gasoline. "All travelling," says Ruskin, "is dull in exact proportion to its rapidity" and this observation has special application in the case of botanical rambles.

Many things combine to make the study of plants enjoyable. Every excursion afield is a voyage of discovery in which one makes new acquaintances, accumulates unexpected treasures, and steadily adds to his stock of mental pictures which it is ever a joy to recall. The botanizer enters a new world from his very doorstep. Poking about the

hedgerows, investigating strange woodlands, exploring unfamiliar ravines, threading the maze of herb and shrub along pond and stream, he is ever on the margin of adventure. Perchance he may find a rare plant never reported from the region, or even a variety previously unknown to science. There is also the chance of his meeting with old plants that are new to him. If these larger experiences do not come his way, there is still the pleasure of finding the very first flower of its kind to open, the possibility of encountering a noteworthy variation in color or form, and the delight of discovering old plants in new settings, not to speak of the mere joy of existence when the trees are in leaf, the birds in full song, butterflies flitting over meadow and thicket, and the earth spangled with flowers.

FLORA OF THE NAVAJO INDIAN RESERVATION—II

By Aven Nelson

THIS short article is offered in continuance of the studies made by Mr. Willard N. Clute in the summer of 1919 The first paper was concerned with the long list of interesting though better known species representative of the Navajo Indian Reservation, and more particularly Navajo Mountain. The present one is an attempt to dispose of a few that are apparently novelties and to locate the rarer and adventive specimens. The latter with notes by Mr. Clute seem to be as follows:

67. *Perezia Wrightii* Gray. Common along the cliffs at Red Canyon near Endische.

77. *Shepherdia rotundifolia* Parry. Endische and else-

where. A very interesting shrub with round, white-woolly leaves that deserves a place in ornamental plantings.

94. *Nama hispida* Gray (?). Common at Endische. Collected also as 141.

98. *Wedeliella incarnata* (L.) ckll. Common at Red Lake.

114. *Grindelia stylosa* Eaton. Red Lake. A very sticky composite.

117. *Verbesina encelioides* Cav. var. *exauriculata* Robins. and Greenm. Red Lake and Marsh Pass.

128. *Mimulus Eastwoodiae* Rydb. In open caves growing in crevices of the rocks at some distance from the entrance. Betatakin Cliff Ruin and Navajo creek.

134. *Oreocarya* sp?

143. *Astragalus* sp.?

146. *Atriplex* sp.?

Eriogonum Ferrissii n. sp. Glabrous perennial with numerous di or tri-chotomous stems from a branched semi-woody caudex, 2-3 dm. high: leaves fascicled-verticilate at the nodes and tips of the stolons, 3-5 or more in each cluster (the dead leaves often persisting on the crowns of the caudex.) small, ½ cm. long, oblong-oblanceolate, acute at apex and tapering cuneately into the slender petiole which is almost as long as the blade except upwards where they tend to become bract-like and sessile: inflorescence mostly 3-rayed, somewhat regularly proliferous a third and even a fourth time, the raylets obscurely glandular pubescent, each terminating in a single several-many flowered involucre; flowers yellow on slender pedicels, glabrous, the segments about 2mm. long, broadly spatulate with long tapering base.

Number 10 c in Mr. Clute's Navajo Indian Reservation

collection, secured at Betakin Ruin, July-August, 1919, is the type. A less well developed specimen, from War God Spring, no. *22*, at about the same time. It seems to belong in the Section *Umbellatae* but in its method of prolferation it appears different from any of the species known to the writer.

Heuchera Clutei n. sp. Scapes glabrous and bractless, 1-2 dm. high, slender, 2-4 times as long as the petioles: leaves several-many, 1-3 cm. broad, on the thickened branches of the caudex, round-cordate, shallowly 3-5 lobed, the lobes crenate-dentate, obscurely hispid with a longer bristle tipping the teeth; petioles sparsely hispid-ciliate, longer than the blade (often twice as long): inflorescence a simple and completely one-sided panicle of 10-20 (possibly more) flowers, obscurely hispid-glandular; bracts evident but small, linear; calyx roseate, narrowly companulate, its obtuse teeth about as long as the tube; petals linear-lanceolate, acute at both base and apex, scarcely exceeding the moderately exserted stamens and styles.

Probably best compared with *H. rubescens* Torr. from which it differs in its smaller size, the complete absence of villosity, the smaller and completely one-sided panicle and relatively short pedicels, and the acute petals.

The type is Clute's no. 80 from near the summit of Navajo Mountain, moist places among the rocks of "Hidden Spring", altitude about 10,000 feet.

Oenothera Clutei n. sp. Probably biennial, the first year showing not only the usual rosette of crown leaves, but sometimes giving rise to sparingly floriferous branches from the lowermost leaf-axils. Most of the plants develop the second year as follows: The basal ascending branches develop first and are so disposed as to give a basket-like

aspect to the young plant, but later the main axis developes rapidly and overtops the earlier sparsely floriferous branches, becoming 6-15 dm. high (according to soil and moisture): stems rather slender, greenish but tinged with red, pubescence thin, of two kinds,—short soft hairs and some stiffer whitish bristles; leaves numerous, from linear to narrowly oblong, 5-15 cm. long, entire or sparsely denticulate, with pubescence similar to that of the stem: inflorencence a crowed corymbiform raceme, becoming typically racemose in age, pubescence as of the foliage but denser and the hirsuteness more pronounced especially upon the calyx lobes: calyx-tube slender, 8-12 cm. long (in average specimens about 10): calyx lobes about 3 cm. or approximately one-third as long as the tube; petals a clear fine yellow, broadly obcordate, more than 3 cm. long, scarcely changed in drying: stamens and style equalling the petals, ovary short, the capsules in age only 3-3 cm. long.

This handsome species is a near relative of *O. Jamesii* T. & G. from which its precocious crown branches, its strict, slender central stem, its calyx-tube, its compact inflorescence of handsome unchanged flowers (corolla often 7-8 cm. across) and its relatively short capsule seem to distinguish it.

The type was secured by Willard N. Clute in the Navajo Indian Reservation, in Arizona, in July, 1919, at War-God Spring, on Navajo Mountain, at an altitude of about 7,000 feet and is his No. 4. Mr. Clute notes that it occurs on both dry and moist ground

In 1920 Mr. Clute secured at the Tuba Oasis, Painted Desert, Arizona, an *Oenothera* (No. 102) that somewhat resembles it but probably may best be referred to *O. Hookeri* because of its short calyx-tube and its less noticeable pube-

scence. Mc Dougal seems to have secured the same thing near Flagstaff, July 8, 1898, his number 251.

Phlox Clutena. n. sp. The herbaceous stems several from an inconspicuous but distinctly ligneous branches base, very slender, wholly simple except for the 3-flowered cyme, 1 dm. (more or less) high: pubescence fine, white and gland-tipped, throughout except on the corolla and the lower leaves (these more or less glaucous); leaves from narrowly to broadly linear, 1-3 cm. long, inclined to coriaceous with noticeable midrib; pedicels 4-10 mm. long, slender; calyx 8-12 mm. long, the very slender lobes more than half the length and evidently carinate: corolla pink, drying more or less whitish, its tube nearly twice as long as the calyx and distinctly longer than the obovate practically entire lobes.

This species is allied to *P. Stansburyi* (Torr.) Heller but lacks the rough pubescence of that and in its simple cyme, its flat leaves and slender stems is at once distinguishable from that.

It is known only from Mr. Clute's No. 18, from near the summit of Navajo mountain. It was found in half shade and is noted as abundant.

Aquilegia Navajonis. n. sp. Stems 3-4.5 dm. high, viscid-pubescent throughout, basal leaves quadriternate, long petioled; petioles and petiolules slender, viscid-pubescent· leaflets small, narrow, cuneate at the base, 1-2.5 cm. long, lobes acute or obtuse, viscid above, viscid-villous beneath; flowers about 4 cm. long, acute, spreading horizontally or slightly reflexed; laminae white (fading yellowish), 8 mm. long, broadly rounded at the apex; spurs white, slender, about 2.5 cm long, straight or slightly incurved, knob of the

nectary small; styles 10-12 mm. long, widely spreading in fruit; follicles viscid-puberulent, 10-14 mm. long.

Only one specimen has been seen. That is Mr. Clute's no. 52, collected on wet rocks, 5000 feet altitude, Navajo Creek, Arizona, July 9th-August 24th, 1919. According to Mr. Clute's notes this is a rare plant with white and pink flowers and vivid foliage. It commonly grows in the crevices of shaded rocks and was also found at Betatakin and on the road to Farmington.

The most outstanding features of this plant are the quadriternate leaves and the very viscid foliage. In the herbarium the sand is still clinging to the entire plant surface. The deeply divided leaves are reminiscent of *A. Eastwoodiae* Rydb. which is also remarkably viscid. From the latter the new species is easily distinguished by the pink sepals, the normal and regular spurs and by the more deeply divided leaves. It seems probable that *A. navajonis* is in reality most closely related to *A. triternata* Payson. That species has triternate leaves and the plant surface is scarcely viscid.

A DISAPPEARING SPECIES

By Dr. F. D. Snyder, F. R. G. S.

THE rare orchids *Cypripendium pubescens* and *C. spectabilis* have become practically extinct in northern Ohio. The last pink lady's-slipper that I saw in this (Ashtabula) county was found by Mr. Louth, a local botanist, about ten years ago. The yellow Lady's-slipper is represented by at least one specimen here at any rate.

About three years ago Professor Craig of our local schools found a beautiful specimen in the woods in this county. He was fortunate enough to rescue it from its native element, which without a doubt would soon have been encroached upon by the agriculturists. This specimen he brought to the city

and set it out at his residence where it has thrived beautifully. It has bloomed every year, and this year it had seven lovely blossoms, and the year before when this picture was taken it had five.

Notwithstanding the fact, that this specimen has been transplanted three times, it seems to be perfect in every way. Here is hoping it will continue to thrive.

PLANT NAMES AND THEIR MEANINGS—X

LEGUMINOSAE—II

By Willard N. Clute

ALTHOUGH there are a number of herbaceous species of Leguminosae the group, as a whole, is a woody one. In the tropics, especially, shrubs and trees belonging to this family are varied and abundant. Among well-know forms are the tamarind, the logwood, the indigo plant, the red-bead tree, and the carob or St. John's bread. In our own region, a tree with all the characteristics of tropical forms is the common locust or false acacia (*Robinia pseudacacia*). In late May when other trees are well in leaf, it hangs out a profusion of fragrant white flowers in pendant racemes. So noticable a tree naturally has a number of vernacular names. The pure white flowers and brownish-yellow heart-wood are responsible for such terms as "white locust", yellow locust," "black locust," and "green locust". Some of these names are not so much given for some charactistic of the tree as to distinguish it from other various forms that also bear the name of locust. "Silver chain," sometimes heard is clearly patterned after "golden chain", a name given to laburnum

(*Cytissus*) whose golden flower-clusters much resemble those of the locust in size and shape. The term "false acacia" which is embodied in the specific name alludes to the resemblance of this species to the true acacias. "White honey-flower" and "pea flower" are of obvious derivation. "Post locust" is due to the fact that the wood is very durable when exposed to the weather which makes it much sought after for posts and pillars. The word "locust" so commonly used for the species of *Robinia* is said to be derived from the insects of the same name which seems hardly credible though there is no accounting for the taste in common names. The locusts that formed the food of John the Baptist were not insects, it is inferred, but the fruit of the carob tree (*Ceratonia siliqua*), and the husks which served as food for the prodigal son just previous to the banquet in which the fatted calf played a prominent part must have been from the same species.

Two other species of *Robinia* are known as "clammy locust" (*R. viscosa*) and "bristly locust" (*R. hispida*). Both vernacular names are free translations of the scientific ones and refer to twig characteristics. On account of their rosy flowers both are also known as "rose acacia". Sometimes they are called "honey locust" but this name more properly belongs to the species of *Gleditsia*. *R. viscosa* is known occasionally as "red locust" and the bristly young twigs of *R. hispida* have gained for it the name of "moss locust." The plant regarded as the true "honey locust" is *Gleditsia triacanthos*. It derives its name, not from any characteristic of the flower, but from the circumstance that the broad, flat, many-seeded pod has a strip of sweetish pulp down one edge of it which may be eaten if one is hungry enough. Other names suggesting the same derivation are "honey shucks"

"sweet bean" and "sweet locust." The term "three-thorned acacia" is sufficiently intelligible especially to those who are familiar with its strong branching thorns. This name ought by right to stand as the accepted vernacular name since it is embodied in the scientific term, but "honey locust" usually has the preference. "Thorn locust" is still another variation of the name. The hard brown seeds are known as "squeak beans" to mischievous school children who are well aware that one of the shining seeds properly twisted under foot will produce a delightful variety of mysterious squeaks gauranteed to try the patience of any teacher.

Another tree whose seeds have acquired for it a number of vernacular names is *Gymnocladus Canadensis*. It is commonly known as the "Kentucky coffee-tree" and occasionally as "coffee-nut", "coffee-tree" and "American coffee-bean." It is difficult to understand the reason for such names for the seeds are much too hard to have served for coffee and in addition possess a glucoside that is reputed to be poisonous. The name "chicot" applied to this species is the French for stub or stump but its connection with the tree is not evident though "stump tree" is one of its, common names. The reference may be to the stubby branches but this is merely conjecture. "Nicker-tree" and "nicker-nut" are terms supposed to have been applied to this species in allusion to the round seeds, like a "nicker" or marble. The plant regarded as the true "nicker-nut" is a tropical species of legume. The hard dark-colored wood of our species is sometimes known as "Kentucky mahogany".

Various species of the Leguminosae have the remarkable peculiarity of folding up their leaves as night approaches and appearing to sleep—though no plant really sleeps—and several others are able to change the position of their leaflets with

great promptness when stimulated. These latter are called "sensitive plants". The classic "sensitive plant" is a tropical species, *Mimosa pudica* very common in the warmer parts of the world and often grown in old gardens and conservatories in northern latitudes. As soon as the leaves are touched they close, the leaflets folding togeather and the leaf itself drooping. In our own region other less active sensitive plants are found. A well known member of this group is the "sensitive rose", "sensitive brier" and "shamevine" whose scientific title is *Schrankia uncinata. Cassia nictitans* is also called "sensitive plant" and "sensitive pea" but it only tardily responds to a stimulus. Its near relative, *Cassia chamaecrista,* is still less sensitive though it folds it leaves at night and is occasionally known as "sensitive plant". The best known name of this latter plant is "partridge pea" though it is not likely that partridges feed upon it. It is distantly related to the medicinal senna and in consequence is sometimes called "prairie senna." Being the smallest of its genus in our region it is occasionally known as "dwarf senna." The species in our flora most commonly called "wild senna" is *Cassia Marilandica.* This species has some of the properties that make medicinal senna valuable and is sometimes substituted for it. *Cassia tora* of the Southern States is known as "sickle-pod" and "coffee-weed," these names refering to the shape of the pods and the hard dark seeds. *Cassia occidentalis* is called "coffee-weed", "negro-weed" and "magdad- coffee". We are unable to explain the last mentioned term or the name "magoty-boy bean" applied to *Cassia chamaecrista.* The word *magot* seems to be French and means an ape. Possibly the names here given may be some fanciful reference to the animal in the same way that the seeds are known as "negro coffee."

Our commonest species of *Baptisia*—*B. tinctoria*—so commonly grows with the partridge pea that the mention of one suggests the other. It is usually called "wild indigo" from the fact that an inferior dye can be made from it. "False indigo" and "yellow indigo" are other names for it, the yellow in the last name referring to the flowers and not to the dye. "Horse-fly weed" "horse-flea weed" and "shoofly" alludes to the belief that sprays of this plant fastened to the harness will protect the horses from flies. "Rattle-bush" refers to the ripe pods in which the seeds rattle, but the term is better deserved by allied species. The name of "clover broom" is in recognition of its resemblance to the true broom (*Cytissus scoparius*). Because of its blue flowers, *Baptisia australis* is called "blue indigo" and "blue false indigo". It is also known as "wild indigo." *Baptisia alba* is the prairie indigo."

Another genus named for the dye it contains is *Genista*. The best known species is *G. tinctoria*, the specific name referring to its use in dyeing. The common names of "dye weed", "green wood,", "green weed," "dyer's broom" and "dyer's greenwood" are self explanatory. The names of "woad-wax", "wood-wax," and "wood wash" are variations of "woad-waxen" a very ancient name by which the Anglo-Saxons knew still another dye-plant—*Isatis tinctoria* one of the cresses. "Whin" sometimes applied to our plant is an old term for weeds in general and was given to various plants as we we might apply the term brush at the present time. It may be remembered in this connection that *Genista* is from a word meaning simply bush. The plant was sometimes called "base broom" to distinguish it from *Cytissus scoparius*. The last mentioned plant is also known as "Scotch broom," "green broom" and "besom." The latter name is the old term for a

broom made of twigs. Possibly the word "broom," itself, may have been derived from the use of the twigs of this plant in besoms. Neither *Genista* nor *Scoparius* are native genera. They have been introduced into America from Europe and have brought their common names with them. A third species of this category is the "furze" (*Ulex Europeus*) which is known as "prickly broom", "thorn broom", "whin" and "gorse". The last term means harsh or bristly and is well applied to this prickly species. The word "furze" is a very early name for this plant.

The species of legumes that have been named "wild pea" would be difficult to count. The very characteristic shape of the blossoms has made the name appropriate in many instances. Among the number is *Crotalaria sagittalis*, though the inflated pods of this species in which the seeds rattle at the slightest jar make the name of "rattle-box" or "rattle-weed" more appropiate. The plant is also known as "loco-weed" but this term more properly belongs to species of *Astragalus* especially *A. mollissimus* and others of the Western States which produce a curious condition known as "loco" in the stock that eat it. "Crazy-weed" is another name for this species given for the same reason. *Astragalus crassicarpum* and *A. Mexicanum* and known as "ground plums" or "earth plums" from the fact that the unripe fruits resemble plums and are edible. The fruits are said to be especially relished by prairie dogs. *Astragalus crassicarpum* is also known as "buffalo pea", "buffalo bean", and "buffalo apple" because it grows in the region over which the buffalo once used to roam. *Astragalus Canadensis* like *A. mollissimus* is also known as "rattle-weed." All the species are known as "milk vetches" though none are known to have a milky juice. *Oxytropis lamberti* should be included here since it has a

sinister reputation as a loco-weed. This species is occasionally known as "stemless loco-weed," "crazy weed" and "Colorado loco-vetch."

The clovers form a wide-spread and well known group and have naturally acquired many common names mostly of obvious meaning. The word "clover", itself, is a corruption of *clava* a club. In support of this it may be noted that the "club" of our playing cards is represented by a conventionalized clover leaf. Clover is supposed to derive its name from the great three-headed club of Hercules. The French word for clover is *trefle* and the Latin is trefoil both carrying a reference to the three leaflets. Probably the best known of the clovers is the common white species (*Trifolium repens*). It is often reputed to be the true "shamrock" but the identity of the plant used by St. Patrick has never been settled. If the plant was a clover at all, the honor seems more likely to belong to *Trifolium dubium* or *T. minimum*. Many people are of the opinion that the wood sorrel (*Oxalis*) is the shamrock. Other names for *T. repens* are "white trefoil" which is self explanatory and "Dutch Clover" from its reputed place of origin. "Honeysuckle clover" refers to the honey or nectar in its flowers and not to the plant by that name. The term "purplewort" means nothing at all when applied to this plant. If used at all it should be given to the red clover (*T. pratense*). A careless bibliographer may have confused the two species. English names for *T. repens* are "sheep's gowan", "honey stalks" and "lamb's sucklings."

The soft furry covering of *Trifolium arvense* seems to have caught the fancy of nature-lovers to judge of such names as "rabbit's-foot clover", "hare's-foot clover", "pussy clover", "pussies," "pussy-cats," and "dogs and cats." "Calf clover" may have the same origin. "Old field clover", "stone clover"

and "poverty grass" allude to the habit this plant has of growing in sterile soil. "Bottle grass", however, is a puzzle. *Trifolium pratense* is the "red clover", also from the shape of its leaves "broad leaved clover", and from its abundant nectar, "honeysuckle clover", "suckles" and "sugar plums". "Marl grass" probably refers to the fact that this plant refuses to grow in soils deficient in lime, and "cow grass" indicates its use as pasturage. Incidentally one notes that in the minds of the uneducated, any plant is grass. *Trifolium medium,* a species greatly resembling the red clover, is known as "zig-zag clover" probably from its flexuous stems. In cultivation it is called "mammoth clover". Being so much like the red clover, it naturally shares its common names. In addition it is sometimes called "pea-vine clover." Another red clover, not to be confused with either of the foregoing, is the "crimson clover" (*T. incarnatum*). The name of "Italian clover" given to the latter plant refers to its place of origin while "carnation clover" is manifestly an attempt by some obtuse individual, to pronounce the specific name, just as "Napoleons" is a similar attempt at the generic name.

Trifolium hybridum is the "Alsike clover" or "Swedish clover", so named because it was common in the parish of Alsike near Upsala, Sweden. "Alsatian clover" is another rendition of Alsike and does not refer to Alsace. The plant has somewhat the appearance of a hybrid between the red and white clovers which fact is reflected in the specific name and in the common name of "hybrid clover." The "Buffalo clover" is a native of the western plains and its vernacular name is almost a foregone conclusion. Our common species of "yellow hop clover" (*Trifolium agrarium*) is also known as "hop trefoil," "yellow clover" and "hop clover." After the blooming season the flower-head dries into an object much re-

sembling the hop which fact explains the common names. A smaller species, less often seen is known as the "dwarf hop clover" or "low hop clover" (*T. procumbens.*)

The average individual makes no distinction between the true clovers and the sweet clovers, though the scientist finds points of difference, and the maker of vernacular names verifies his observations. Owing to the clover-like leaves, most of the common names indicate a relation or resemblance to the species of *Trifolium.* The "white sweet clover" (*Melilotus alba*) is called "honey clover" and "tree clover" the latter on account of its size. The "sweet" in the names of plants in this genus does not refer to the nectar, though this is abundant enough to place the plants among the best honey-producers, but to the strong, vanilla-like fragrance given off by the plants when drying. This fragrance is due to a substance very similar to the real vanilla. "Melilot" and "white melilot" are derived from the generic name and "honey lotus" is a direct translation of it. "Cabul clover" and "Bokhara clover" evidently refer to the original home of the plant. The specific name of the "yellow sweet clover" (*M. officinalis*) indicates that it was once carried in stock by the apothecary. This probably explains its name of "heartwort," since it was valued for a variety of ills. "Hart's clover" shows how easily a similarity of sounds may lead to the origin of a meaningless common name. The species was originally called *corona regia* and from its regal reputation "king's clover" and "king's crown" have been derived. The name of "plaster clover," it is surmised, indicates a medical use. "Balsam flowers" is probably from the same circumstance.

NOTE *and* COMMENT

Easter Lilies from Seeds.—Those who grow lilies usually depend upon the importers of bulbs for their specimens, but it appears that some sorts may be easily grown from seeds in this country. In China and Japan, where lily bulbs are used for food instead of for ornamental planting, it is quite likely that they may be grown in this way. Experiments in raising the bulbs of lilles from seeds have been carried on by the United States Department of Agriculture for the past six years and it is now stated that flowering bulbs may be easily produced in America by this method. The seed is sown late in autumn for spring germination. It is not stated how long it requires to produce bulbs of flowering size, nor what species is meant by Easter lily though it is probable that *Lilium candidum* is meant. The Department *Weekly News-Letter* from which this information is abstracted, fails to be explicit on this point. Such vagueness characterizes much of the information about plants sent out from Washington and gives point to the old jibe about "Washington Science."

Akela-berry.—The akela-berry (*Rubus Macraei*) is an unfamiliar name among tropical fruits but it has long been known to botanists, having been discovered by the United States Exploring Expedition to the Pacific and named by Asa Gray. The plant grows wild in the elevated parts of the Hawaiian islands, the vines sometimes reaching a length of

twenty feet and a diameter of two inches. The most astonishing feature of the plant are the gigantic berries which attain a diameter of two inches. Some of the berries are large enough to cover a silver dollar. Unlike certain gigantic blackberries from other parts of the world the fruits of this species are said to be very juicy and of good flavor. It is likely that it will be introduced into cultivation in the cool, moist regions along our Pacific Coast.

Cold and Dormancy.—From experiments recently carried on by Government botanists, we may discover why it is that hardy plants brought into the house in autumn will not renew their growth, while the same plants left in the ground until they have been exposed to freezing temperatures for a time, will resume growth at once. It is the custom of those who grow rhubarb for the early market, for instance, to dig up the plants and allow them to freeze before starting them to grow. In some of the experiments referred to, other plants when kept from the cold remained dormant for an entire year. Other experiments showed that the effects of cold are felt only in the parts exposed to it. Plants were grown in such a way that part of the plant was exposed to the cold and part kept warm and when the whole plant was then exposed to warmth, only the part exposed to the cold grew. The theory upon which this peculiar behavior is accounted for is that growth does not begin until some of the starch stored in the cells has been turned to sugar. The enzyme that converts the starch to sugar is supposed to exist outside the plant cells and to be unable to penetrate into them until the cell wall has been weakened in some way, as by freezing. Support is lent to this theory by the fact that various injuries to the plant, such as rubbing the bark, girdling, pruning or notching the stem, produce results similar to those produced by the cold. When

the starch is turned to sugar, it increases the osmotic pressure in the cell and in this manner is believed to stimulate the cells into new growth. It is probable that different plants require different lengths of exposure to the cold in order to resume growth. Not only may the effects of chilling be noticed in the mature plant, but it appears in seeds as well. The practice of planting various seeds in autumn may, after all, be for the purpose of exposing them to the cold instead of breaking the shells as commonly assumed.

Offensive Luxuriance.—In the English *Garden* Miss Gertrude Jekyll complains of a number of beautiful plants which, admitted to cultivated ground, thrive so well that they encroach upon better specimens until their room is better than their presence. Since they thrive so well in a variety of soils, they are naturally hard to eradicate. Among such noxious species she lists the common horsetail (*Equisetum arvense*), the great yellow loosestrife (*Lysimachia vulgaris*), the common tansy (*Tanacetum vulgare*),the field scabious (*Knautia arvensis*), the wood sorrel (*Oxalis violacea*), the field bellwort (*Campanula rapunculoides*) the goutweed (*Aegopodium podagraria*), and the enchanter's nightshade (*Circaea lutitiana*). To this list the editor of the *Gardener's Chronicle* adds the obedient plant (*Physostegia Virginica*), and the purple loosestrife (*Lythrum roseum*). It is likely that the plants mentioned would not prove equally weedy in all gardens, however. The soil often has a considerable influence on the luxuriance of a given species. The writer of this paragraph has found the tawny day lily (*Hemerocallis fulva*) too pushing for respectable garden company but considers the day flower (*Commelyna communis*) a far greater pest. Costmary (*Chrysanthemum balsamitae*) perhaps better known as sweet Mary or rosemary, is another quickly spreading plant, but the worst of

the whole category is one of the evening primroses, *Oenothera Fraseri*. The worst pest one can get into his lawn is the common moneywort (*Lysimachia nummularia.*)

Poisonous Milkweeds.—We have already called attention in these pages to the fact that a western species of milkweed, *Asclepias galioides*, is poisonous to stock. Further investigations by the United States Department of Agriculture indicate that several other species or forms closely related to the whorled milkweed (*Asclepias verticillata*) of the Eastern States are also poisonous. These forms are wide-spread in the West. *Asclepias galioides*, however, is the most venemous of the lot, being recorded as ten times more poisonous than *A. verticillata* var. *Geyeri* of the Great Plains region. In the latter region is also found *A. pumila* and on the Pacific Coast from California to Washington occurs *A. Mexicana*. *A. galioides* is found in Arizona, New Mexico and contiguous territory. Fortunately the plants are not readily eaten by cattle and sheep and few cases of poisoning ordinarily occur, but when stock have difficulty in finding other food they may eat the plant with fatal results. It may be noted that the common milkweed (*Asclepias syriaca*) is regularly used as a pot-herb in Eastern America and appears to have no poisonous properties. The swamp milkweed (*Asceclepias incarnata*), however, is looked on with suspicion and practically never gathered.

Acid Soils.—It is an obvious fact that plants do not grow just anywhere. Each species is closely related to its environment. One grows only in sandy places, another on limestone rocks, others in clay and still others in muck or peat. In general, plants do not thrive in the last mentioned soil because of its acidity and the plants that are able to live in such places form a very interesting group. Among them are the

insectivorous sundews, pitcher plants and butterworts, the cranberry and other heaths, various orchids, the cotton grass and the peat mosses (*Sphagnum.*) Naturally such plants are difficult to manage in cultivation. They appear to miss their acid soil and are especially intolerant of limestone. People in limestone regions have usually had to deny themselves the pleasure of growing such species and have thereby missed a number of fine flowers, such as rhododendrons, kalmias, and azalias. The trailing arbutus and blueberry are other heaths that have thus far resisted practically all efforts to cultivate them in ordinary garden soil. The trailing arbutus, especially, has the reputation of being impossible to grow away from its native haunts. Some years ago, however, it was discovered that this plant would grow in soils containing considerable amounts of oak leaves and now Henry Bird has discovered that in regard to the pitcher-plants, at least, a small amount of tannic acid added to the soil, will reconcile the plants to domestication. The acid is supplied by an extract of hemlock bark in the proportion of one part of the acid to from fifty to a hundred parts of water. It is at present unknown whether other plants may be induced to grow by like treatment, but from the fact that oak leaves aid the arbutus to thrive, it appears likely that tannic acid, or perhaps other organic acids, may be all that is needed to promote the growth of acid soil plants under garden conditions. The subject is one that offers most interesting opportunities for investigation by those who have access to a small greenhouse. By setting up a series of potted plants as nearly alike as possible, and watering them with dilute solutions of different acids, it would soon be apparent whether a single acid can produce the effect, or whether several acids have the power. To discover just what acid will

most readily induce acid soil plants to grow in our gardens would be a most important accomplishment.

WESTERN PLANT NAMES.—Concerning certain plant names mentioned in this magazine, Prof. J. C. Nelson writes: The word "Thorn-apple" seems very elusive. I never heard it applied to either *Crataegus* or *Datura;* when we used it in Kentucky, it meant *Solanum carolinense*, a very bad perennial weed of sandy fields, and interesting because it was attacked by the Colorado potato-beetle almost as eagerly as was the cultivated *S. tuberosum*. I wonder if this application of the name was only local? The books call this plant "horse-nettle;" but I never heard this applied to it.

Will you tell me by what name the "giant rag-weed" (*Ambrosia trifida*) is referred to in different localities? In Kentucky we used to call it "horse-weed", because it was greedily eaten by these animals. The last time I was in northern Minnesota, I found that the Scandinavian settlers had begun to call it "king-head", from a fancied resemblance of the akene with its sharp points to a crown; and this name has now got into some of the weed-manuals. How far south does it extend? Is there any common name for *Iva xanthiifolia?* You know how abundant it is in the Northwest, and what gigantic size it attains; and yet I can never remember hearing any popular name applied to it. Around deserted homsteads it almost reaches the size of a tree. I had always supposed that *Ginkgo* took the name of "maiden-hair fern tree" from the shape of the leaves, which very closely resemble the pinnules of *Adiantum*. Of course, the root may have something to do with it; but I believe the leaf first suggested the name. [The point about the maiden hair fern tree is simply this: the fern was named from its roots because they were assumed to resemble hair and therefore according to the

doctrine of signatures, good for the hair. Thus arose "maiden-hair fern" applied to species of *Adiantum*, and maidenhair spleenwort applied to *Asplenium trichomanes*. The resemblance of the leaves of *Ginkgo* to the pinnules of *Adiantum* made it maiden-hair fern tree originally though it is probably maiden hair tree now.—Ed.]

Color Combinations.—A color combination that I saw near Westbury was worthy of note. A fine patch of mealy star-grass (*Aletris farinosa*) with their slender wands of frosty bells towered above patches of some violet-colored flower which I was unable to tell at a distance. I got out of the flivver to investigate and found it was a dwarf aster which answered the description of *A. linearifolius*. Only once before had I seen it. In an open wood near Manchester, Conn., it thrives beautifully but I did not expect to meet it in company with *Aletris farinosa* on Long Island. Another combination that appealed to me in the South Mountain Reservation, of Orange N. J. was the dogwood and pinkster-flower blooming together. The shower of snow-white bracts blended beautifully with the deep pink of the buds and partly opened bells on the bare straggling branches of this dainty azalea. Surely a floral picture of the highest order. When the heather and the broom are blooming on the Grampian mountains in Scotland there is displayed a natural combination of purple and yellow that is hard to beat. Perhaps the New England aster and the goldenrod come nearest to it.—*R. M. Crocket, Cranford, N. J.* [Residents of the Middle West would venture the assertion that when the redbud and wild plum are blooming, or when the wild crab thickets hang out their myriads of pink and white blossoms, the Alantic Coast would have to look to its laurels in more senses than one, if it would avoid being excelled.—Ed.]

Changeable Cactus.—From the desert region of western Arizona Mr. James H. Ferris sends us a specimen of cactus whose color-transformations are a strong source of interest. The plant is a globular species thickly set with stout grayish thorns that must render it very inconspicuous in its desert home. The instant that rain touches it, however, it becomes a ball of flaming crimson and one of the most conspicuous and handsome plants in existence. Investigation shows that the thorns are really a deep red but so heavily covered on both surfaces with a forest of waxy columns that the color is masked. When water falls on the thorns, however, the wax becomes nearly transparent and the deep red, shining through produces the change noted.

High Growth Temperatures.—A number of simple plants are known that are able to exist in hot springs whose waters are nearly at the boiling point, but more complex forms of vegetation are quickly killed at such temperatures; in fact a temperature of 122° Fahrenheit (50° C.) is regarded as fatal. Some forms of cacti, however, seem not only resistant to dessication but to heat as well. In a recent number of *Science*, a report from the Desert Botanical Laboratory in Arizona notes that joints of a hardy *Opuntia* or "prickly pear" were observed to continue growth in a temperature of 136° F. Other plants subjected to a temperature of 144° F. resumed growth when the temperature was again lowered. This is the limit for active protoplasm, so far as known, and it apparently is not likely to be much exceeded.

Navajo Evening Primrose.—Those who are interested in the evening primroses may be glad to know that they can secure seeds of the Navajo species from this office for ten cents a packet. We shall be glad to exchange for seeds or plants of other primroses from the Great Plains region.

EDITORIAL

This magazine is unlike all other botanical publications in the United States in that it is not issued and financed by a society or association of some kind. It has, to be sure, a considerable list of "patrons" who have consistenly supported it for many years and also a number of "associate editors" though some of these may not be aware of the title—who send us notes, suggestions and friendly criticisms as occasion warrants, but of clubs to shape its policy, there are none. As an independent publication, therefore, it has nobody to please but its readers and the editor's sole aim is to make a publication worthy of their support. At the beginning of a new volume and enlarged magazine, it may not be amiss to direct attention again to this fact and to invite everybody to join in making it a publication to their liking. We want especially those short notes which everybody makes mentally and so few transcribe to paper

* * *

It is possible that the editor of this magazine and a small party of the scientifically inclined will make another expedition to the Grand Canyon, the Painted Desert, Navajo Mountain and the Rainbow Bridge next summer. If there are any members of the *American Botanist* circle who would be inclined to make such a trip we would like to hear from them. There are no regular means of transportation to most of the points mentioned but by making up a small party the cost of the trip is not excessive.

It is some time since the World War was won and wages in many industries have returned to something approximating normal, but the printing trades still adhere to war prices. The only material that has lowered in price is paper. The printers have not only shortened their hours, but in many localities have increased their wages while illustrations of all kinds were never higher. The increased cost of printing which such conditions necessitate is having a most harmful effect upon scientific publications. A large number of the periodicals are late, or not issued at all, while book after book that in normal times would be re-issued is now allowed to go out of print since it is no longer profitable to carry it. There are now only two fern books obtainable and a large number of popular books on plants, birds, insects, etc., have disappeared from the market. The avaricious publisher, not to be outdone by the printers, has doubled and even trebled the price of books issued at low cost before the war and because the market for nature books is limited, is not issuing others. We cannot recall a single important botanical work issued in America in 1922. All this spells stagnation for science and hard times for the printers, who in spite of high wages are not noticeably prosperous.

BOOKS AND WRITERS

The date palm (*Phoenix dactylifera*) the fruit of which with us is regarded as a sort of confection, is an important food plant in the warmer parts of the world. So extensively is it cultivated in Mesopotamia that V. H. W. Dawson of the Agricultural Directorate of that region has found it desirable to publish a memorial on the subject under the title of

"Date and Date Cultivation of the 'Irag." The work is to be completed in three parts, the first two of which have already been issued. Parts 1 and 2 deal with the cultivation and yield of the date and the final part, which is in preparation, will take up the discussion of the varieties cultivated. The parts which have appeared are extensively illustrated by maps and photographs which graphically tell the story of the culture, harvesting and packing of the date. The publishers are W. Heffer & Sons, Cambridge, England. Part one in paper costs ten shillings and part two in the same binding is priced at five shillings.

In sublimity—the superlative degree of beauty—what land can equal the desert with its wide plains, its grim mountains and its expanding canopy of sky? You shall never see elsewhere as here the dome, the pinnacle, the minaret, fretted with golden fire at sunrise and sunset; you shall never see elsewhere the sunset valleys swimming in pink and lilac haze, the great mesas and plateaus fading into blue distance, the gorges and canyons banked full of purple shadow. Never again shall you see such light and air and color, never such opaline mirage, such rosy dawn, such fiery twilight. And wherever you go by land or sea, you shall not forget that which you saw not but rather felt—the desolation and the silnce of the desert.—JOHN C. VAN DYKE.

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DESERT TRUMPET FLOWER.—*Datura meteloides*

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THE AMERICAN BOTANIST

VOL. XXVIII MAY, 1922. No. 2

Under a budding hedge I hid
While April rain went by,
But little drops came slipping through,
Fresh from a laughing sky:
A-many little scurring drops
Laughing the songs they sing.
Soon found me where I sought to hide
And pelted me with spring.
—Shaemas O'Sheel

OLD GARDEN FLOWERS—III

THE DATURAS

SPECIMENS of *Datura* are rarely seen in the more pretentious gardens of the present day but in old-fashioned communities somewhat remote from urban influences, the "angel's trumpets" as they are commonly called are not unfamiliar sights. There are several reasons for the neglect of this most beautiful and highly decorative group of plants. The most significant is probably the fact that included in the group is the despised jimson weed (*Datura stramonium*) of waste grounds and rubbish heaps and its unsavory cousin the purple thorn-apple (*D. tatula*) also a friendless outcast. It is difficult for the grower to realize that he is not cultivating jimson weeds. Another species, *Datura metel*, may be occasionally cultivated—it finds favor at times in Southern Europe for its fragrant though small flowers—but it barely crosses the line that separates the weeds from the flowers in the gardener's lexicon.

The ample leaves of soft green give to the cultivated species an attractive look even when out of bloom, but when the plants are brightened by hundreds of immense flowers like morning-glories, they present a sight that is long to be remembered. The flowers are often a foot in length and white tinged with violet in color. In most of the species the flowers are borne erect, but in others they hang down, probably from their sheer weight. For the most part the Daturas have the habit of blooming at the approach of evening but the blossoms seldom close with the promptness that characterizes other night blooming species which makes then ornamental for a part of each day.

Undoubtedly the best species for out-door cultivation in the United States is the desert trumpet flower (*D. meteloides*) of Mexico and the Southwest, shown in our frontispiece. It grows quickly from seed, begins to bloom early in July, and when once in flower continues to produce its great, showy, lilac-tinted blossoms until frost. It is commonly treated as an annual but it is really a perennial and will stand temperatures nearly to zero if protected. The species most commonly seen in cultivation is *Datura fastuosa*. It is a native of India and is usually known as *Datura cornucopia* in the catalogues. This is the plant most commonly known as angel's trumpet or horn-of-plenty. The double form in which there are often three corollas, one within another, is much admired but frequently this form is merely a mass of petals,white within and purplish without. When the trumpets are complete and distinct, the flowers may have some claim to attractiveness, but since the shape and size of the blossoms are their chief claims to beauty it is likely that single forms may prove more desirable. A yellow-flowered plant has been called *Datura*

chlorantha but it sems doubtfully distinct from *D. fastuosa*. It is likely that a number of other varieties of this species may have distinguishing names in the dealers' lists.

The *Daturas* are all plants of tropical and sub-tropical regions and for this reason many species must be cultivated under glass in the United States. In the warmer parts of the world the plants are often shrubs or small trees and some of these latter forms are frequently placed in the genus *Brugmansia*. Two of these, *Datura arborea* and *D. suaveolens*, are among the tree-like species and have great pendulous blossoms a foot or more long. *Datura suaveolens* is said to be a native of Mexico and *D. arborea* of Peru and Chili, but they are so much alike that they are distinguished with diffuculty without the calyx. In *suaveolens* the calyx is tubular and five-toothed; in *arborea* it is spathe-like and not toothed. A second Mexican species, *D. cornigera*, is rather like these but never to be mistaken for them because it has a long spur produced from the calyx. The latter species is especially known for its strong fragrnace. A red-flower plant, *D. sanguinea*, from Peru has smaller ordorless blossoms.

There are possibly twenty-five different species in the genus *Datura*, widely scattered in the tropical regions. The group belongs to the Solanaceae or Nightshade family and like its relatives has poisonous or narcotic properties. None however, are poisonous to the touch. They are harmful only when eaten and the nauseous taste should prevent experiments in this direction. The leaves of *Datura stramonium* are often smoked to relieve asthma and this species still retains a place in the Materia Medica. Other species are used to produce a sort of intoxication and *D. meteloides* is used in the religious ceremonies of the Indians of our own Southwest and as

a sort of anaesthetic in their rough surgery. The ripened fruits of nearly all the species are spiny and this accounts for the name of "thorn-apple" applied to the jimson weed in Europe. One of the interesting features of the flower is that the long tubular calyx which encloses the other parts of the blossom until flowering is over is finally cut off by the plant about half an inch from where it joins the stem and falls with the corolla. In most cases the flowers last but a day but new blossoms are always ready to take their places.

All the species that will grow in the open in our latitude are very easily cultivated. They are fond of strong sunlight but have no special predilections as regards soil though a sandy loam seems to suit them as well as anything. It is the lack of fastidiousness in habitats that makes several of the species weeds, but this family charteristic makes them excellent subjects for experiment in the hands of the inexperienced gardener.

THE CLASSIC YARROW

By Virginia Ballen

LEGEND and history enhance plants as well as places. Why then is the classic yarrow treated in California with scant respect and little admiration? It certainly saved our pioneers frow various evils before doctors had arrived in the new land. We seem to have forgotten all the old stories about it. Almost we have forgotten the old fashioned name.

Withered old Spanish women still gather it but they call it "milhojas". In the far places Indian squaws use it still making great secret about its gathering, as is their manner when they go herb plucking. But each tribe has a grunted name for the plant that gives us no picture of yarrow; though once in a while one's nose may perhaps in a city handicraft

shop. Some Mahala Mary has thriftly used her woven ware against the time of its selling. The tang of yarrow is the basket's predominating smell.

Most children cast it out of their wild flower bouquets calling it a weed. It is the children who must keep alive the folk-lore of plants. Dear me have these had no grand mothers?

Getting at the character of wild plants is likely to develop in one an indifference for the merely sentimental perfumes of garden flowers. The yarrow has a bitter-sweet virile fragrance. It means something. What does it mean? Well, to one it means medicine.

To another it recalls the Siege of Troy story and the sulky Achilles who it is said first found out the potency of the plant which gave it its botanical name, *Achillea*. We do not know if he made a plaster of yarrow and applied it to his vulnerable heel, but it is written he tried it upon his soldiers' weaknesses with good success.

To others the smell of yarrow brings up tales of gypsy charms and love-lorn women of whom many a one down the ages has picked it from a grave at midnight murmuring an incantation the while. Later it was presented to the refractory lover.

Faith and the oftimes much wilted yarrow and—Oh yes, other things beside—, usually got the lover back. For in those days the blood had not run so bitter and cold. It sometimes happened then that money was the least of all magic.

We wonder if the yarrow recalls old tales too; quaint customs of a more romantic humanity. We bend to the flat topped clusters studded with small white shallow flowers, enameled and aromatic. The yarrow has bloomed through many changes of the earth's vegetation itself remaining un-

changed. We say to the ferny leaved aboriginal yarrow "Never mind, primitive women and primitive plants will have their day again."

Some of us love the yarrow just for its fine closely set beauty. Other bright flowers arranged with it, are given added grace of color and form; that spark of tone and contrast a touch of white always draws forth in flowers, faces, land-and water-scapes.

Many bugs beetles and short tongued bees fly long distances following the strong scent of yarrow. Look at that smoke of red lady bugs wavering out of the cool shadow of willows. Like blown sparks they drop to the yarrow. The taste of the plant is offensive to birds. Bugs and beetles know this and many directly or by substitutes fill their bodies with the juice of yarrow. Some insects dote upon the acrid juice and others top off with it as a safety medicine. These red lady bugs are especially fond of the plant lice that live upon hoarhound, tansy, milkweed and yarrow.

Yarrow stops nose bleed and when pushed up a well behaved nose causes it to bleed. It cures ague but if given to one without malaria brings on chills and other ague symptoms If bound on a healthy hand or foot it will cause rawness of the skin and by the same token will heal old sores. A strong infusion of the plant will break up a cold overnight but will over come the lesser ailment with a fit of staggering and stupor. It will cause healthy bones to ache but a strong tea taken at night will in a week or less cure inflamatory rheumatism. You see the yarrow is a potent and powerful plant. Admire and respect it. Never use it trivially. It is the herb of gypsies. It is the witch's plant. It is one of the simples of good and wise old women. It is in the medicine case of some few wise old country doctors. Yes indeed you must

be most careful in calling upon the yarrow. It may lose you a lover. It may make incantations go wrong. It may bring on at least temporarily the very disease you dread. Only be sure that you have got the formula right that you use its magic correctly and the yarrow will give the benefit you crave. And for all this the herb is not very different from about a thousand other old world and new world plants. For in all vegetation there is more or less occult utility and magic.

Always consult what we may call the soul of the yarrow, in arranging it decoratively in a room, never put it with a flower that has not the remotest tendency toward affinity with the yarrow, lesst the two abash and offend each other. Never with lillies, camilias, orchids nor violets. Blossoming wands of yarrow look well with heavy hanging man-made chrysanthemums, with crimson and purple horticulturally doubled zinnias, with the airy painted cosmos, with frilled and fluted dahlias bred to gorgeous hues.

But companion the yarrow with the plumes of golden-rod and wild purple asters and the pink fringy Erigeron in a long black pottery jar such as the Havasupais Indians make and you have a poem in your room, an earth-sung poem. And this should be in a simple wilderness home, with windows opening out upon the unspoiled gardens of God.

IMPORTANT MOVEMENTS OF PLANTS

By John J. Birch

THE movements of plants are far more complex and numerous than those of animals. Because of the complexity and variability of movements, a general outline inclusive

of all, would be quite impossible. In fact there are some movements peculiar to certain plants and dependent on temporary or occasional factors which become modified by environment. Every animal movement is the result of a tension of muscles regardless of the stimulus; but such cannot be said of plants.

CIRCUMNUTATION

The most common and universal movement found in the plant kingdom is circumnutation. It is the elliptical or circular movement, made by apparently every growing part of all plants. The movements vary greatly in form and amplitude with different species. Some plants describe larger circles than others, while those which describe ellipses have a still greater variation.

Circumnutation is brought about by a growth, first on one side of the organ and then on the other. The cells become steadily more and more turgescent on one side until the part suddenly yields and bends. Then they become more so on the other and the part swings around again. It is probable that the more rapid the growth the greater the movement, until the plant is full grown, at which time circumnutation would be very slight. Just why every part of a plant while it is growing and in some cases after growth has ceased, should have the cells rendered more turgescent, and the walls more extensile, first on one side and then on another, thus inducing circumnutation, has not been conclusively shown. But by all appearances it would indicate that the changes in the cells require periods of rest.

The seat of circumnutation in leaves generally lies in the petiole, but sometimes in both the petiole and the blade or in the latter alone. The extent of the movement varies in different plants. It is chiefly in a vertical plane,rising from 2 to

10 degrees in the average plant. The rising and lowering lines never coincide thus giving a lateral movement as well; the two motions which when combined, generate irregular ellipses. The amount of vertical and lateral movement varies with the time of day, amount of moisture and heat, and due to these conditions the ellipses are variable.

The periodicity of plant movements is a very interesting phenomena. Generally they rise a little in the evening and early part of the night, sinking again on the following morning. The upward movement in the evening is at first slow, beginning at very different hours, and gradually increasing to a maximum. Leaves possessed of a pulvinus have more distinct nocturnal movements, known as "nyctitropic movements." The insectivorous plants are very little affected as far as their movements are concerned by light, and it is probable that they do not have any night movements.

CIRCUMNUTATION OF CLIMBERS AND RUNNERS

The simplest case of modified circumnutation is found in the movemment of climbing plants, with the exception of those which climb by rootlets or motionless hooks. The climbers have a tremendous amplitude of movement, caused very likely by the greatly increased growth over a small length. The movement is more regular than of ordinary plants, but the ellipses are formed in all directions.

This power is innate in the plant, and is not excited by any external agent except touch so far as can be ascertained. It is this power which has been gained for the sake of enabling climbing plants to ascend to a greater height and thus reach more light. The tendrils in their movement, feel a support and twine spirally around it. The circumnutating stems of some plants can twine around a support only when it is thin and flexible, while some can twine around a support

only when it is more than a few inches in diameter, while in tropical forests some can embrace enormous tree trunks.

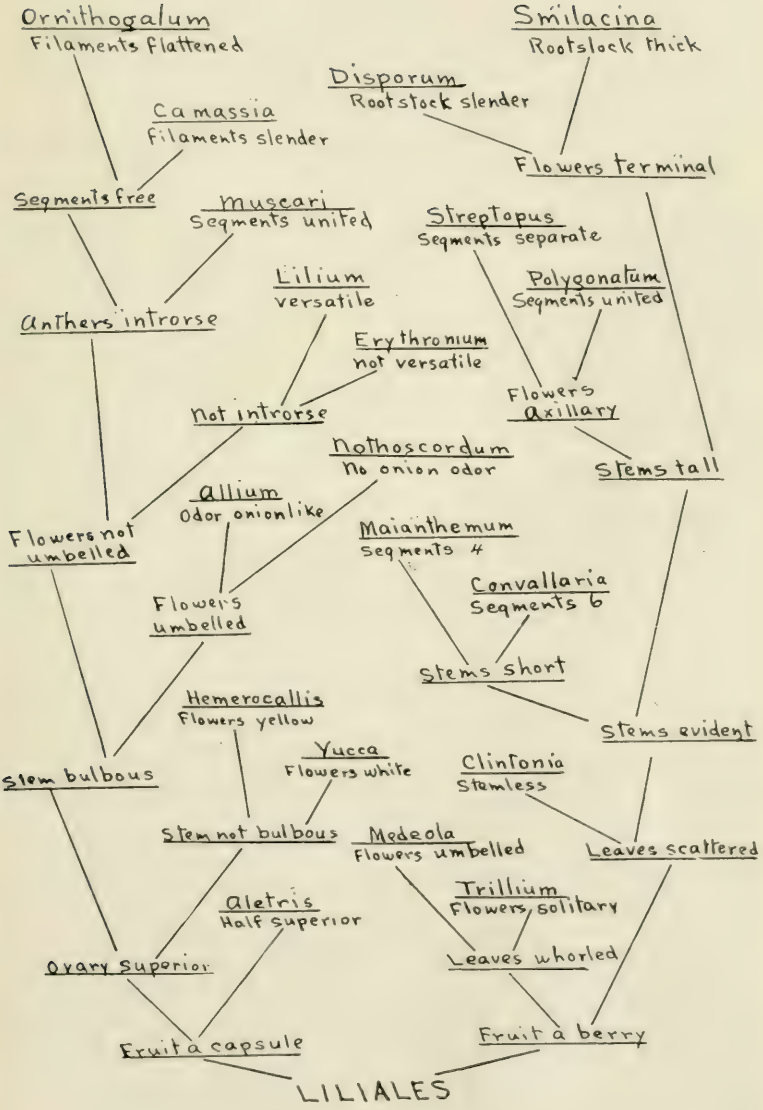
The runners of creeping plants have a very complex movement. It is obvious that this movement aids them in finding a passage between surrounding plants and other obstructions. If they did not circumnutate, their tips would come in contact with obstructions and double up, thus hindering the spreading of the plant from the parent stock. Their chief motion is vertical and due to the weight of the end of the stolon, the ellipses formed have long vertical and very short horizontal axes.

(*To be continued*)

A NEW FORM OF KEY

NO matter how carefully the technical keys are constructed by the skilled botanist, the novice always has more or less difficulty with them. It is not easy to follow directions in all cases and a single slip, of course, lands him in a group that may be quite remote from the one his plant is in. The Key on the opposite page is not open to this objection for all the searcher has to do is to follow up the lines from Liliales on the bottom line until he reaches the genus he is in search of, being careful to take the correct line at each fork of the road.

The Key is not designed to show relationships though it naturally throws similar plants together and therefore gives the beginner a somewhat comprehensive survey of the group to which his plant belongs. The genera keyed out here are those in the two most important families of the Liliales. If it proves serviceable to students, keys of the other groups may be printed in later issues.


Ornithogalum
Filaments flattened
Smilacina
Rootstock thick
Disporum
Rootstock slender
Camassia
Filaments slender
Flowers terminal
Segments free
Muscari
Segments united
Streptopus
Segments separate
Lilium
versatile
Polygonatum
Segments united
Anthers introrse
Erythronium
not versatile
Flowers
axillary
Not introrse
Nothoscordum
No onion odor
Stems tall
Allium
Odor onionlike
Flowers not
umbelled
Maianthemum
Segments 4
Convallaria
Segments 6
Flowers
umbelled
Stems short
Hemerocallis
Flowers yellow
Stems evident
Yucca
Flowers white
Clintonia
Stemless
Stem bulbous
Stem not bulbous
Medeola
Flowers umbelled
Leaves scattered
Trillium
Flowers solitary
Aletris
Half superior
Ovary Superior
Leaves whorled
Fruit a capsule
Fruit a berry
LILIALES

BOTANY FOR BEGINNERS II.

By Willard N. Clute

IN the popular mind the pursuit of botany is so indissolubly connected with the study of flowers that these structures are often assumed to be the only parts of the plants of any real significance. The beginner is always astonished when he discovers that many of the formal courses in school and college do not mention the flowers at all. He may even wonder what there is left to study if the blossoms are eliminated; certainly these are the parts that make any plant worth while to him. Indeed, the word flower in his vocabulary is often extended to include the whole plant, and he speaks of cultivating his flowers when there may be no blossoms in sight.

It is a comparatively new idea that the production of flowers for ornament is not the end and aim of the plants existence. In the long ago, it was universally believed that flowers existed solely for the delectation of mankind. It never occured to those early observers to wonder why the lines and spots that so often ornament the interior of tubular blossoms were not on the outside if they were designed to be seen and admired by human beings. Nearly everybody, nowadays is aware that flowers have been envolved without any thought of pleasing that species which rather boastfully styles itself the Lord of Creation. That their beauty and fragrance happen to please man is merely so much his good fortune.

The bees and butterflies discovered what those lines and

spots were for, millions of years before mankind even began to look at them. It was not, in fact, until the middle of the 17th century that the German Botanist, Sprengel, pondering over the visits of the insects to the flowers in his garden, solved the mystery of the blossoms and discovered their connection with the production of seeds.

Since Sprengel's day we have found out much that he did not know about the flowers and have discovered numerous others that the ancients probably did not regard as flowers at all. Even now we may find individuals who reserve the title for the bright-colored forms and speak of all others as weeds. Such people are commonly of the opinion that our forest trees do not bloom. They can usually recall seeing certain caterpillar-like structures on the trees in the spring, but they regard these as mere excrescences to be thrown off with the bud-scales and loose bark as a natural accompaniment of the resumption of growth. When the pollen is showered down from the millions of pine blossoms the average individual never surmises its origin but is convinced that some distant volcano has suddenly become active and thrown out a cloud of sulphur.

It is, of course, quite natural that the novice should be primarily interested in the flowers. They are by long odds the most attractive of the plant parts and make a nearly universal appeal. Those who take up the study of plants out of school nearly always begin with the blossoms. In a few case the beginner may have his curiosity aroused by a fern, a moss, a lichen or a bit of seaweed and develop a predilection for investigating such things, but if left to himself, he usually begins with the largest and brightest blossoms. Those who have become specially interested in the plants can usually recall the very species and the incidents which sent them off on

their botanical hobbies. It is said that the botanist, Asa Gray, was impelled to desert medicine for botany by the examination of the common little spring beauty. Another botanist of note once told me that the multidudes of hepaticas in our spring woods induced him to take up the study. The biographies of botanists contain many such instances. The inclination toward flower-gathering is possibly the survival of a very ancient practice. Savage man, it is well known, wore flowers long before he wore clothes; in fact, in the remoter parts of our planet, the inhabitants are still in the flower-wearing stage and even in civilized regions, though clothes may appear to be of more importance, we continue to include flowers as a sort of decoration.

It is difficult to imagine a more harmless and pleasent pastime than flower-gathering. Bird study probably comes next to it, but birds have to be carefully stalked through forest and glade while the plants do not require even this exertion. Rooted in the soil they await the coming of the collector, but not to make the conquest too easy, they have their times and seasons for appearing at their best and must be found when they are displaying their blossoms to make the occasion complete. Like other coming events, however, the blooming period casts its shadow before and one may anticipate the climax in swelling buds and lengthing flower-stalks. It is one of the satisfactions of plant study that the various species have a fair degree of permanency in the locality. It is as if they held part of the landscape by right of ownership. If they are to be found at all, they will be right where they were last year and others are quite likely to be found in similar localities elsewhere. The collector rarely returns from his expeditions empty-handed. Each trip is a real voyage of discovery and the treasures secured are so many visible evidences of his

success; to be shown to friends, to be preserved in the herbarium or to be cultivated in the garden as perennial reminders of the pleasure experienced in their original discovery.

No matter what phase of plant study interests the novice, his first requirement is for the names of his specimens. When he has a species firmly anchored to a name, he has the means by which he can handle his find mentally, can discuss it with his friends or look up additional facts about it in the books. The failure to find such names readily has probably done more to discourage the beginning student than any other single thing. And since the name is of such great importance the novice too often considers attaining it the object of the quest. To be sure this is the object of all keys, scientific or otherwise, and many books seem written with the same end in view, but it is truly said that the names are but the alphabet of botany. If one becomes interested in mere names, he runs a risk of wearing out his locality in a few years and of being obliged to turn to something else for amusement, but when he becomes interested in the lore of the plant world, he finds in a single locality, material for the study of not one but many lifetimes.

The names that the beginners desires are not those used by the strict scientist. He wants the common names of plants —those homely meaningful names by which the common people know them. These are often much older than the science of botany itself, having been in existence almost from the beginning of our language. Unfortunately the names now in use have been derived from a multitude of sources and often do not carry with them the exactness of designation required by science. Gradually he comes to see the necessity for the technical terms. These latter were evolved after a multitude of changes but have now reached a fair degree of brevity and exactness. Up to the middle of the eighteenth

century, however, the best the scientist could do was to refer to his plants by a long series of Latin terms. It was the great Linnaeus, "the Father of Botany" who perfected the scheme of giving to each plant a name of two words which corresponds roughly to our christian and surnames. This scheme has been universally adopted but it still affords opportunity for some particularly astonishing combinations as in *Kraschenninikowia Maximowiczziana,* the name of a small anemone of the Old World. The absurdities to which the system may run when variations of the species engage the attention of the matter-of-fact botanist is seen in such combinations as *Prunus Pseudocerasus* Lindley, subspecies *Jamasakura* (Sieb.) Makino, variety *glabra* Makino, forma *praecox* Makino which is the full title of one of the cherries so dear to the heart of the Japanese. Happily such monstrosities are the exceptions which prove the rule. They are the "horrible examples" of the science. Ordinarily the technical names of plants are not difficult. None are harder than rhododendron, chrysanthemum, ranunculus and similar names in daily use by the non-botantical.

The question is often asked why plants need to be given such outlandish names at all. To this it may be replied that owing to the wide distribution of plants, the names cannot be scetional or even national in character. We must have names that any student, no matter what his situation, can use and understand. It is probable that the use of Latin or Greek for such names was not at first regarded as important. The languages mentioned happened to be those in which most books were written at the time the scientific naming of plants came into fashion and it was natural that the names selected by scholars should be from those languages. The selection, however, seems to have been most fortunate for the Latin is now a "dead" language in which the meaning or form of words

do not change as they often do in modern languages. Thus we may have stability in meaning if we cannot have it in nomeclature.

When it comes to learning the names of plants, it may be said that in botany as in other studies, there is no royal road. The ordinary road, however, has been greatly improved of late. The bad places have been bridged by various "how-to-know" books and guides have been set up that make it increasingly difficult to miss the way. In any event the present generation has many facilities for identifying plants that the early student did not possess. People in middle life can remember the time when there were no botanical books intended expressly for beginners. In those days digging out a scientific name from the technical works was a demonstration of unusual intellectual ability. Nevertheless the study of botany was particularly recommended to young ladies as not too taxing to their minds.

At present there are many ways of becoming acquinted with the plants. One of the easiest is by associating with a more learned companion and obtaining a considerable education "by absorption." Those who take up botany by themselves frequently get one of the popular handbooks that are now so common and identify their specimens by color of the flowers or the place of growth. The great trouble with such books is that they frequently omit the very species for which we are looking. We trace it to its group, we encounter relatives that look much like it, we say "it must be here somewhere"—but it isn't. After a few such disappointments the earnest student buys a real Manual and determines to master the technical keys. With such a book, he knows that his species is to be found if he has the ability to trace it.

The two Manuals most commonly used are Britton's "Flora of the Northeastern States and Canada" and Gray's "New Manual of Botany" the latter in its seventh edition. Britton's book has better keys but uses a discredited nomenclature and splits the plants into a larger number of species. Gray's Manual is probably somewhat easier for the beginner in spite of its poor keys since it does not make so much of minute differences in structure. Wood's "Class-book of Botany" was probably better than either of these for the beginner, but it is now long out of print and only to be found in the libraries of older students. Scarcely second to the Manuals as a source of information are the botanical journals which continually discuss unfamiliar plants or publish new and interesting items about well known forms. The reader therefore soon has a number of mental pictures of plants which he has never seen but which he is frequently able to identify at sight when he comes upon them later, from their remembered descriptions. Who is there that has passed the initial stages of botany who cannot recall many occurrences of this kind; indeed, who is there that is skilled in botany who does not, even now, have numerous pictures which are still to be matched with realities?

Every flora has its rarities which both botanist and botanizer are anxious to see, but naturally enough, they never agree as to which are rare. The botanist is quite likely to be attracted to some insignificant specimen whose value depends upon it being out of range, or a variety of some better known species, but the botanizer is more likely to be in search of such famous plants as the pitcher plant, walking fern, sundew, moccasin-flower, shooting-star, compass plant, ginseng, Dutchman's breeches, cardinal flower and even trailing arbutus and mountain laurel. How many times have we all made long journeys just to see a single one of these! And how many

more expeditions we expect to make to see other plants which we now regard as fully as attractive!

PREPARING SUCCULENT PLANTS FOR RAPID DRYING

By Dr. N. M. Grier.

SUCCULENT plants such as species of *Cactus*, *Sedum* and others do not readily respond to the ordinary methods of pressing and drying in preparation for herbarium specimens. One method of hastening the dessication has been to apply pressure to the specimen with a hot iron, a process which is laborious and frequently requires a disproptionate amount of time. Another is to immerse the plant in hot water, but as a result the specimens may turn dark and in moist climates are apt to become mouldy unless special precautions are taken. Finally, where the specimen will permit such, botanists remove the surface which would be invisible in the mounted specimen and scoop out the water retaining tissue, after which pressing and drying is somewhat facilitated.

All of these methods, however, have their disadvantages, and at the suggestion of Dr. O. E. Jennings, Curator of Botany, Carnegie Museum, I have endeavored to obtain more quickly and conveniently through chemical agencies, the effects upon plants of this type secured by the methods of killing previously indicated, which result of course in the loss of turgidity and death of the water retaining tissue. Specimens treated chemically in the way to be described, have not only dried and pressed more quickly, but have been pronounc-

ed by botanists to be equal if not superior to those obtained by the older methods.

The experiments upon which this newer method rests were made at the Biological Laboratory of the Brooklyn institute of Arts and Sciences, Cold Spring Harbor, N. Y. during the summer of 1921. The following species of succulent plants were used, *Opuntia vulgaris* Mill, *Salicornia europea L.*, *Sueda maritima L.*, *Sedum purpureum* Tausch, *Cakile edentula* Hook, and *Arenaria peploides L.* The starting point was the study of the effect upon these plants of the more common fixing and killing reagents known to the plant histologist, with preference given to those more cheaply obtained and more likely to be a reagent in the herbarium. To facilitate the pentration of the reagents, incisions were made at from 1-3 in. intervals along the stems or stem-like structures of what would eventually be the ventral surface of the plant when finally mounted. In *Opuntia*, however openings were made all around the edges of the separate phylloclades, and the epidermis of one side of these punctured with a needle at the point of attachment of the spines. Each specimen of plant used was then immersed in a quantity of killing fluid about five times its own volume, and weighted down if necessary with a piece of glass. Controls for the experiments were made by preparing other herbarium specimens in the ways first indicated. The results of interest to the systematic botanist from the series of experiments are now present under the headings of the reagents used.

Medium Chromo-Acetic Acid Solution. (Basic formula as designated by Chamberlin: Chromic acid, .5 gm; glacial acetic acid, .1 gm; water, 100 cc.) Well perforated specimens of the above named plants were treated with this fluid from 24-43 hours; in the of *Opuntia*, a longer time varying

according to the size, although 72 hours was abundant for most specimens to completely assume the color of the reagent, when they may be removed and washed. Six to twelve hours of the latter usually removed most of the stain of the chromic acid, leaving a color easily as desirable as that secured by ordinary methods of preparation. The chemically treated specimens after drying and pressing were ready in most cases for mounting at least three days ahead of the controls, and showed no tendency to mould in the moist climate at the Laboratory. Specimens of the cactus acquire a leathery consistency and an olive green color. This killing fluid and the following may be used at least three times without impairing their powers for this purpose.

Formalin-Acetic Solution. (Basic formula: 100 cc. 4% formalin; 3cc. glacial acetic acid.) Under similar conditions to those governing the use of the medium chromo-acetic solution, similarly satisfying results were obtained by the use of formalin acetic solution. Penetration was more rapid, and the period of washing is safely abbreviated. The treated specimens exhibited a somewhat pale color, and with prolonged exposure to the reagent became somewhat fragile and brittle.

Denatured Alcohol. (This was 95% alcohol apparently containing formalin.) After 24-43 hours treatmentwith this fluid, followed by 3-4 hours washing, small specimens of all the plants with the exception of *Arenaria* were ready for pressing and drying. In the case of *Arenaria*, the brittle quality of the leaves was best overcome by the use of the other killing fluids. Specimens treated with alcohol were of a paler color than those treated with other chemicals, althought there was not any great appreciable difference in the cases of *Sueda* and

Salicornia. The denatured alcohol may be used for this purpose at least three times.

Potassium hydroxide. (5% solution.) Although used principally as a macerating agent, this compound yielded excellent results with *Sueda* and *Salicornia,* the specimens remaining mostly a normal green color. A much shorter period is required for washing. With the other plants it was unsatisfactory, probably on account of slow penstration. All specimens treated with it show a tendency to mould unless quickly dried. With such a precaution, the satisfactorily treated specimens were ready for mounting two days ahead of the control.

Washington and Jefferson College, Washington, Pa.

PLANT NAMES AND THEIR MEANINGS—XI

LEGUMINOSAE—III

By Willard N. Clute

CLOSE to the sweet clovers, comes another familiar genus *Medicago* to which belongs the "alfalfa" (*M. sativa*) and others. In the Old World, alfalfa is commonly known as "lucerne" from the belief that it was originally from Switzerland. Britton and Holland in their "Dictionary of Plant Names" however, say that the plant is not especially common about Lucerne and that Europe did not get its supply from Switzerland. Place names, it is well known, are no indication of nativity. Our "Canada thistle" is not a native of Canada. "Burgundy trefoil", "Brazilian clover" and "Spanish trefoil" are other names for the alfalfa that are no more appropriate than others mentioned. Our species, like several of

its allies was also known as "medick". "Purple medic" alludes to the color of the flowers and "snail flower" probably refers to the coiled seed-pod, though by rights *Medicago scutellata*, a species often cultivated in gardens, is entitled to this name. This plant is another of the "sain foins". The name appears to be applied to any kind of valuable forage plant though probably the original "sain foin" was *Onobrychis sativa*. This latter species was anciently called "lucerne", also, and this doubtless accounts for the curious tranposition of common names. "Holy hay" applied to our plant is a monument to the stupidity of some early writer who mistook the French word signifying health for the word saint. The word alfalfa, itself, is a rendition of the Arabic *alfacfacah*, according to the dictionary.

Medicago lupulina is commonly known as "nonesuch." The reason for this is not apparent for the term nonesuch commonly means very superior. There is, however, a secondary definition of the word which indicates unequalled badness and it is possibly in the latter sense that the name is applied, for the plant is an insignificant weed of no especial value. It has, however, a multiplicity of common names. Perhaps "black medic", "black nonesuch" and black grass" may refer to its disreputable qualities though "black-seed" seems to put the emphasis elsewhere. "Hop clover", "yellow hop clover" and "hop medic" refer to the resemblance of this plant to the "low hop clover" (*Trifolium*).This species is often sold as the true shamrock, which for all we know of the matter it very well might be. "Sain foin" naturally falls to a species of *Medicago* and "horned clover" evidently refers to the seed pods. *Medicago denticulata* bears the name of "bur clover" and it would be singular if other members of the genus have not acquired it.

Not all plants are clovers that are called so. Any plant with leaves of three leaflets are likely to be regarded as belonging to the group, however, and we are prepared to hear the species of *Lotus* and *Hosackia* called "trefoil" and bird's-foot trefoil". Our only species of *Hosackia* is also know as "wild vetch" and "prairie bird's foot trefoil". *Lotus corniculata* is an introduced plant and has an abundance of vernacular names of no special interest on this side of the water. Among them are "ground honeysuckle", "bloom fell", "cat clover," "crow's toes", "cross toes", "sheep-foot", "shoes and stockings", "bird's eye" and "ladies fingers." The "prairie clovers" are found in the genus *Petalostemum*. The common name is fairly appropiate, for the species when in flower rather closely resemble clovers. In addition to the general name, *P. candidum* is known as "white tassel flower". *P. purpureum* is the "red tassel flower" the "tassel", be it known alluding to the elongated spikes of flowers. After the petals have fallen, the close-set seed-pods give the plants the name of "thimble weed".

Among the more curious of the legumes are the species of *Amorpha* whose flowers can boast of only a single petal. *A. canescens* is commonly known as "lead plant", because, according to Wood it grows near lead ore. Others say the name is not from any connection with the metal but because its densely downy leaves give it a hoary appearance which by a great stretch of imagination might be considered to be lead-colored. Other names are "lead-wort" and "wild tea". Since the plant is not used for tea it is conjectured that "wild pea" may be intended by the latter name. "Shoestrings" is a term that refers to the long and slender, but strong, roots. *Amorpha fruticosa*, a taller species, is "lead plant", "river locust" and "false indigo." The locust-like leaves and the

plant's habit of growing along river banks makes the second name appropriate while the resemblance to the true indigo plant which grows in parts of its range makes a distinction between the true and the false necessary.

Peas and vetches and well mixed in the three genera, *Tephrosia*, *Vicia* and *Lathyrus*, most of which have tendril-bearing pinnate leaves. *Cracca*, the Latin term for vetch, is often substituted for *Tephrosia* in the scientific terminology. Our commonest species of *Tephrosia* (*T. Virginica*) is an interesting plant with downy gray leaves and flowers of pink and yellow. Its commonest vernacular names are "hoary pea" and "wild sweet pea". Rabbit pea" and "turkey pea" are other names probably of fanciful origin. "Goat's rue" is another well known name for the plant, but its application is obscure for there is no resemblance to rue. The names "devil's shoestrings" and "cat-gut" refer to the strong, wiry roots. Like most sand plants, the roots of this species extend for long distances and interfere with the plow.

Lathyrus is the real sweet pea genus. The "sweet pea" of our gardens is *L. odoratus* and the perennial pea" or "everlasting pea" is *L. latifolius*. Because of its fondness for growing in sterile places near the water, *Lathyrus maritimus* is known as the "beach pea", "seaside pea" and "heath pea". *Lathyrus decaphyllus* is the "prairie vetchling" or "everlasting pea" and *L. palustris* is the "marsh vetchling" and "wild pea". An Old World species, *Lathyrus pratensis*, which has become sparingly naturalized with us has, as usual, a number of vernacular names such as "mouse pea", "cow peas", "Tom Thumb", "angleberries" and "ladies fingers".

The plants most entitled to the name of "vetch" are the species of *Vicia*, since the word vetch, itself, is only another rendering of the generic name. "Tare" applied to several

species seems to imply worthless characters and "tare vetch" or "tare fitch" are old names for weedy plants that were better exterminated. The word "tine" has something the meaning of tare and is illustrated in such terms as "tine-weed" and "tine tare", applied to *Vicia hirsuta* of Europe which is now naturalized here. Other names for this plant are "tare", "tare vetch" and "hairy vetch". "Strangle tare" is an appropriate name for a plant that climbs upon and smothers other species. The large bright flowers of *Vicia Americana* have caused it to be known as "wild sweet pea", "purple vetch" and "wild pea". Other names are "American vetch", "peavine" and "buffalo pea". *Vicia cracca* is the "Canada pea", "blue vetch", "cat peas", "bird vetch" and "cow vetch", the last three being more fanciful terms than real names associated with the animals indicated. *Vicia sepium* is the "wild tare" or "crow peas" and *V. tetrasperma* is the "lentil tare", the lentil meant, of course being the well known legume of that name. *Vicia sativa* is known as "spring vetch."

Still another group of plants sometimes called peas belong to the genus *Vigna*. The well known "cow pea" of the Southern States is *V. sinensis*. It is also known as "whip-poor-will pea", "lady pea", "black-eyed bean" and "China bean". *Phasolus polystachos* is the "wild bean" or "kidney bean". *Centrosema Virginiana* is the "spurred butterfly pea". *Amphicarpa monoica* is "hog peanut", "wild pea-vine" and "wild peanut" which names refer to the underground pods produced by the cleistogamous flowers of this plant. The name "licorice" sometimes found in books, seems to be a misnomer for our plant which but slightly resembles the true licorice (*Glycerrhiza glabra*) a plant of the Old World. Our "wild licorice" (*G. lepidota*) is called "American licorice", licorice root", "sweet root", and "sweet wood".

The *Wisteria* of our gardens is a chinese species (*W. Chinensis*) but the genus is found in both Hemispheres and the American species, *Wisteria frutescens*, is frequently cultivated. Being a legume it may possibly be entitled to the name of "kidney bean tree" but "virgin's bower" is surely a misnomer. Owing to the resemblance of *Apios tuberosa* to the *Wisteria*, it is often called "wild wisteria". It is however, more frequently known as "ground-nut" in allusion to the rounded tubers, in no sense roots, which form part of the monilliform rootstock. These tubers are edible and were, in fact, the first "potatoes" brought back from explorations in the New World. The Indians made regular use of them. A considerable number of other names allude to these tubers among which are "potato pea", "Indian potato", "pig potato", and "white apples". The plant is also known as "trailing pea", "ground pea", "wild bean", and "travellers delight". The last name seems like a book name, but the fragrant chocolate colored flowers perhaps deserve it.

Several species of *Psoralea* produce edible parts, but unlike *Astragalus*, the edible portions are the roots. The specific name of *Psoralea esculenta* alludes to its edible properties and among its vernacular names are "prairie apple", "prairie turnip", "prairie potato", "Indian bread-root", "Cree potato", "Missouri bread-nut" and "tipsin" or "tipsinna". The last mentioned sound supiciously like the Indian name for the plant. "Pomme blanche" the French for white potato, and "Pomme de prairie" are self explantory. *Psoralea hypogaea* is also known as "Indian bread-root". *Psoralea onobrychis* is known as "French grass" and "sain-foin psoralea". The Old World "sainfoin" was *Onobrychis sativa* and the common name which may be translated as safe or healthful hay or grass was undoubtly transferred to our plant because of this

resemblance. Thomas Nuttall gave the specific name *onobrychris* to our plant from its resemblance to the European species. In all probability the name "Sampson snakeroot" applied to *Psoralea pedunculata* is derived from "sainfoin", "Bob's root" and "congo-root" applied to this species are unintelligible to the writer. *Psoralea floribunda* and *P. tenuifolia* are known as "scurvy-pea". This name has nothing to do with scurvy, however, but refers to the white-hoary covering of the young plants and should properly be written "scurfy pea!"

To all the species in the genus *Desmodium* the names of "bush trefoil", "tick trefoil", "beggar-lice" and "beggar's ticks" are applied. Anyone who has stumbled into a thicket of these plants in autumn will recognize the appropriateness of the designations. In addition *Desmodium Canadensis* is called "sain foin". *Desmodium Michauxii* is known as "dollar leaf", for what reason we know not, and "hive vine" which we suspect refers to its nectar-yielding properties. Another "hive-vine" is *Cornilla varia* a plant better known as "coronilla" or "crown vetch". These latter names refer either to the use of the flower as garlands, or more probably to the crown-like head of flowers. The plant is also called "axseed" and "axwort" for no reason that we can discover.

The striking racemes of blue and white flowers should have secured for *Lupinus perennis* a better vernacular name than that of "wild pea" and thus relieved us from calling the plant "lupine". The most descriptive but little used name is "sundial" possibly in allusion to the round pinnate leaves whose leaflets spread out in a circle like the conventional sundial though Wood says the reference is to the leaves which follow the sun all day. "Quaker bonnets" and "old maids bonnets" are probably book names imposed for the fancied resemblance of the keel of the flower to the head-

gear mentioned. The "false lupine" is *Thermopsis rhombifolia* which is also called "yellow pea", and "bush pea". Its congener, *T. mollis*, also bears the latter name. Here we may also list the "bush clover" (*Lespedeza capitata*) which, owing to its downy leaves, is also called "dusty clover".

A fine, though somewhat rare, tree native to the Ohio valley is the "virgillia" (*Cladrastis lutea*). The plant was originally called *Vergillia lutea* which accounts for the common name. The species has long pinnate leaves, white locust-like flowers and yellow wood and naturally becomes "Kentucky yellow wood", "American yellow wood", and "yellow locust". "Fustic tree" is another reference to its properties as a dye-wood, the fustic of the tropics being used for the same purpose. "Gopher wood" is unintelligible to the writer. It was the name of a unidentified wood used in the Ark by Noah but it is not likely that the supply was imported from Kentucky!

In spring when the young leaves are just unfolding, *Cercis Canadensis* covers its young twigs with an abundance of pink flowers and, notwithstanding the fact that it is in full bloom before it is noticeable, is very generally known as "red-bud". The European species seems to have escaped this name but to have fallen upon a worse one being called "Judas tree". By virtue of belonging to the genus, our plant inherits the name though it is without significance thus applied. The tradition is that the flowers of both species were originally white until Judas selected the European *Cercis siliquastrum* on which to hang himself. Since then the flowers have been blushing for their involuntary connection with the affair. "June bud" applied to our species is apparently a hybrid between "Judas tree" and "red-bud". "Salad tree", a name given in the books, is inexplicable.

NOTE *and* COMMENT

DATURA METELOIDES.—The desert trumpet flower is frequently offered in the seedsman's lists, but if any of our readers wish to experiment with seeds from the plants shown in our frontispiece, they may obtain packets from this office for ten cents.

GREEN TRILLIUMS.—In certain red-flowered species of plants it is not uncommon to find specimens with white or albino flowers. Such forms are most frequently noticed in plants whose blossoms are colored by the cell-sap. In flowers colored by minute grains called chromoplasts, white forms are much harder to find; in fact, it is rare to find such blossoms without a trace of other colors. Usually the color of the specimen is greenish or yellowish white. In the older books, *Trillium erectum* is credited with a whitish variety, *alba*, but this so called variety is now known to be a distinct species and bears the name of *Trillium declinatum*. The modern manuals retain a green-flowered species of trillium as *Trillium viride*, but those who are familiar with *Trillium sessile* in the field are inclined to regard the green form as a mere variation. It has no distinctive habitat but occurs mixed with *T. sessile* almost anywhere. A more interesting form is a yellow-green specimen of *Trillium reflexum* brought to our attention by Mrs. Everett Lewman. In this the petals are somewhat enlarged and leaflike and of a pale greenish-yellow. The claws of the petals are of the familiar brownish-red as

are the stamens also. It is of course, only a color form, but to distinguish it we may call it *Trillium recurvatum* forma *luteum.*

Cultivating Trailing Arbutus.—It is commonly believed that it is impossible to grow the trailing arbutus (*Epigaea repens*) in the garden . This opinion has some foundation in fact for an immense number of attempts have been made to domesticate it without success. Until recently the fact that this plant, like so many other heaths, prefers an acid soil was not sufficiently appreciated. That the plant can be induced to bloom in an ordinary flower-pot in the greenhouse by giving it the proper soil conditions, is by this time well known. All that seems necessary is to pot it in an acid soil of the "upland peat" type, formed from the decay of oak leaves. Last August it occurred to the editor of this magazine to make another attempt to grow arbutus in the garden. A small clump of the plant was dug up in Michigan and transferred without delay to a spot on the north side of a wall where the soil is sand mixed with humus from an upland oak wood. It is gratifying to record that the plants bedded with oak leaves, came through the recent rather trying winter unharmed and have since produced an abundance of blossoms. Reviewing this experiment, it seems quite likely that protecting the plants from the sun in the winter is quite as important as the character of the soil in determing their survival.

Color of Carolina Anemone.—That diminutive and early flowering species of anemone known as *A Caroliniana* is apparently not a familiar plant to the makers of popular books on wild flowers; at least not a single volume that we can find, even mentions it. It is, however, a very attractive little plant with roundish leaves ternately divided and the divisions again variously toothed and lobed. From the midst

of these leaves springs a single flower which Wood says is fragrant but which does not appear to be always so. Possibly it is owing to its rarity that technical botanists fail to agree on its color. Gray calls it purple, or whitish; Britton makes it purple varying to white and Wood calls it white or rose-colored but adds that the outer sepals are dotted with purple. It is difficult to understand what these authors mean by purple. The purple of the ancients was what we would call a brilliant red, nearly the color of the British flag. Modern purple is supposed to run all the way from lilac and violet to mauve, but as long as we have these separate names for the different colors or shades it is scarcely scientific to lump them all under the term purple. In the vicinity of Joliet, *Anemone Caroliniana* is fairly abundant and the plants conform to the book descriptions in having white flowers varying to rose-color. There is in addition a form exactly matching in color the early violets and this form does not appear to intergrade with the others. In order to give it a distinctive name we may call it *Anemone Caroliniana* forma *violacea*. It resembles the type in everything save the deep violet- colored flowers.

Western Plant Names.—The various species of *Brodiaea* are known as "fool's onion," the leaves, flowers and bulbs closely simulating *Allium*, but wholly without alliaceous taste or odor, so that the hungry traveler who thinks he is going to have a feast is badly fooled! *B. Douglasii* is sometimes known as "wild hyacinth," though, as you remark, this name more properly belongs to *Camassia*. The many species of *Calochortus* are collectively known as "Marioosa lily,"and locally in Western Oregon as "cat's ear," from the fine wool on the inside of the petals. This name properly belongs to *Hypochaeris radicata*, which in the Northwest re-

places the dandelion as the chief lawn-weed. The native species of *Fritillaria* and especially *F. pudica*, are known as "rice-root" or "Indian rice," from the small pearly-white bulblets, shaped almost exactly like grains of rice. *Erythronium giganteum* is known universally in Oregon as "lamb's-tongue" —probably from the shape of the leaves. *Zygadenus venenosus* is the plant commonly known as "death camas." Our only *Stenanthium, S. occidentale*, is too infrequent to have any common name. I know a farmer who stubbornly persists in applying the name "death camas" to *Muscari comosum*, which is well established on his farm. *Xerophyllum tenaxis* is known as "pine-lily," or more frequently as "bear-grass." The long, tough leaves are used by the Indians for basket-making. The Californian *Chlorogalum pomeridium* which occurs also in southwestern Oregon, is called "soap-weed" or "soap-root," because the roots make a soapy emulsion in water.—*J. C. Nelson, Salem, Oregon.*

Fruits of Japanese Quince.—Paul Winkler writes from Dallas, Texas, that *Cydonia Japonica* bears fruit quite often in the South or even as far north as Southern Kansas. "The fruit seems to stay on the bushes nearly all winter", he says, "Only four days ago [Jan. 20] I noticed a plant with about ten large fruits. I wonder if the climate has something to do with the color of the fruit. The ones I saw in Northern Oklahoma were yellow-brown all right but the ones I see here in Northern Texas are bright yellow. Bailey's Cyclopedia is right in the latter case."

Chaptalia.—In March the wet grounds in the pine barrens from North Carolina to Texas are usually sprinkled with with small, white, daisylike flowers which rise on scapes from a rosette of lanceolate leaves densely woolly beneath. It is an unassuming little herb but one quite remarkable from the fact that it is the only member of the Compositae or aster

family in North America in which the disk-flowers are two-lipped or bilabiate as the botanist has it, like the flowers of sage or snapdragon. Under the lens the tiny flowers are seen to have a three-lobed lip on the side toward the exterior of the flower-head and a two-lobed lip toward the center. The ray-flowers are usually white but sometimes they are tipped with red giving the flower-head somewhat the appearance of the English daisy. In books whose nomenclature follows the "American" Code the plant is called *Thyrsanthema semiflosculare*. That spring had reached North Carolina by the middle of March was attested by specimens of this plant in bloom sent by H. A. Rankin of Hallsboro.

Changing the Sex of Plants.—The majority of plants have stamens and carpels in the same flower but a good many others vary this arrangement. In some cases the stamens and carpels are on separate plants as in the willow and cottonwood; in others they are on different parts of the same plant as in the pines and maize. In the group of which the Jack-in-the-pulpit or Indian turnip (*Arisaema triphyllum*) belongs, some plants bear only carpels, some bear stamens, and some a mixture of the two. This condition suggests that the sex of such plants is not so rigidly fixed as it seems to be in other plants and might not be incapable of change. Among some of the lower plants, sex often appears to be determined by the food supply. In some of the ferns the prothallia grown on sterile media may produce nothing but sperms similar to the pollen elements, while an abundance of food results in archegonia containing eggs such as are found in the carpels. A similar conditions exists in the gametophytes of *Equisetum and Selaginella*. In the *American Journal of Botany* for February, Dr. J. H. Schaffner records his experiments with the Indian turnip and its ally the green dragon (*A. dracontium*) in try-

ing to discover if feeding has any effect on the sex of plants. By proper manipulation of the food supply he was able to change staminate plants to carpellate plants and vice versa. More remarkable still, after turning carpellate plants into staminate plants, he was able to turn them back to carpellate plants again the following year. It seems likely that the completely staminate plants found in nature may be plants that were exhausted the previous year by seed production. Somewhat similar conditions have been found by Dr. Schaffner in the hemp (*Cannabis sativa*) and by others in *Mercurialis annua*. Dr. Schaffner concludes his paper with the following: "In nature, we see quite generally the existence of positive, negative, and neutral conditions and the physicist is inclined to interpret these conditions in terms of positive and negative electricity. Whatever the fundamental cause of the positive and negative state of matter will be found to be, it will probably also give a clue to the remarkable duality and dimorphism which we call sexuality and which is a characteristic of all plants and animals except the very lowest".

Pitcher-plant Indoors.—I doubt if it is generally known that the pitcher-plant (*Sarracenia purpurea*) is a plant which takes very kindly to life indoors in winter. A friend of mine was presented with two thrifty plants at Thanksgiving-time in 1921 and told that they might live until Christmas. They were set in moss in a fairly deep dish in which water was kept standing as well as in the pitchers. They were kept with other plants on a stand in front of a south window. It is now three months since the plants were brought into the house and they are as fresh as at first and are sending up new leaves. While teaching in a little country school in New Hampshire several years ago, the children brought me a pitcher-plant which we placed in an old tin basin and kept where

it received no sun at all. In a few weeks it surprised us by sending up a flower stalk and we had the pleasure of watching the bud develop into a flower. It would be interesting to hear from others who have experimented with this plant in winter. —*Mrs. Viola F. Richards, South Deerfield, Mass.*

Color Combinations.—Every locality I have been in could lay claim to superior beauty of its color combinations at some season. The most striking were the sweeps of primroses and forget-me-nots on the upper slopes of Pike's Peak. Of course the effect was intensified by the absence of trees, the background of immense bare cliffs, and the wonderful blue of the sky. The purple mists of pentstemons that drift over the foot-hills of Colorado in July are no more wonderful than the crimson flames of paint-brush (*Castilleja*) that kindle the Wyoming ranges in June. The golden blaze of ten thousand acres of rabbit-brush in September in no more beautiful than the gray film that clouds league after league of sage land in the hunting season. Our own local colors are blue and gold, the blue from dense acres of Wasatch beard-tongues sweeping up to steeps densely sodded with dwarf sunflowers and visible for miles in June when the lower gravel hills are red from the ripening *Bromus tectorum*, locally called June grass.—*Mrs. M. E. Soth, Pocatello, Idaho.*

The Bluet in Winter.—A very common little plant has been the source of much pleasure to me during the winter. This is the modest bluet (*Houstonia coerulea*). The time to secure these plants for winter use is in autumn after several severe frosts have occurred. By careful search of those places in which you remember to have seen the bluets in bloom you will be able to find the tiny round leaves, now rather brown but quick to respond to warmth and moisture. Take up several of the little clumps—it is not necessary to have much earth

with them—and set them in a dish deep enough to hold a little water. Keep water around the roots all the time and let the plants stand in the sunshine. Within a few weeks you will be rewarded by a mass of blossoms. Bear in mind, however, that they will not amount to much unless they have been well frozen.—*Mrs Viola F. Richards.*

Another Lawn Pest.—Any one who has vainly contended with the moneywort in an attempt to extirpate it from a lawn where it has decided to take up its residence, will not be inclined to dispute your contenion that it is the "Worst pest one can get into his lawn". But it has a worthy rival in a plant that has recently appeared in one of our handsomest lawns here in Salem, and that has every evidence of becoming a very tough customer to get rid of. It is the "mouse-ear" (*Hieracium Pilosella*), a small perennial with long stolons that lie prostrate in such a way as to escape the lawn-mower, and are covered with small leaves that much resemble those of *Antennaria*. Within 24 hours after the mower has gone over the lawn, our plant sends up a slender scape some 10 cm. high, bearing a solitary pale-yellow dandelion-like head at the summit, which matures seed before the next trip of the mower, and continues this game of hide-and-seek all summer. It spreads very rapidly, and apparently nothing but a complete plowing and sifting of the soil will eradicate it. The plant seems to be well known in the East, but I can find no record of its previous appearance in Oregon.—*J. C. Nelson, Salem, Oregon.* [In the third volume of this magizine a form of Prunella (*P. vulgaris var. nana*) was described which differs from the type by lying flat on the ground and rooting at every joint. This is a good example of a machine-made species for it is only common in lawns and appears to have taken on the

new form to avoid decapitation by the mower. As it roots at every joint it is another species hard to eradicate,—Ed.]

Evening Primrose Names.—Commenting on the article in the last number, Prof. O. A. Stevens writes: "The species to which the name *pallida* is applied is a night blooming one, but we have a closely related one, *pinnatifida*, which appears to be day-flowering according to my observations. There has been considerable confusion in the use of these names. I notice also that you do not mention the species *serrulata*, a very common day-flowering plant of our prairie region. I do not know whether it has ever been cultivated or whether it is capable of being so. The *Pachylophus* is truly a beautiful thing, growing as it does with us on the bare buttes in the Bad Lands. I have a very distinct recollection of trying to collect seeds from it an finding the crowns so woody that I nearly wore out my fingers trying to twist out the capsules".—[The species called *pallida* is apparently a stray from farther west. A confusion of names is likely responsible for the misapplication. The form named is day-blooming where we have seen it growing. Ed.]

Lilies from Seeds.—With regard to your note on Easter lilies from seeds in the February number it may be interesting to mention a hardy lily that is easily raised from seeds. I have reference to *Lilium regale* the new lily from China introduced by Professor Wilson of the Arnold Arboretum several years ago. The gardener on the Dukes farms, Somerville, N. J. sowed seeds of this lily in the green-house during January, trasplanted the seedlings to well prepared beds in the summer where by fall they had developed bulbs of considerable size. These he lifted and stored for the winter setting them out again in the early spring. A large precentage of them flowered the following July. A year later, having been left undisturbed, they produced a full crop of flowers. Thus

a period of eleven actual growing months was all that was required to flower this lily from seed. The bed referred to is about six feet by seventy-five and was certainly a wonderful sight. The harmonious blending of pink, white and yellow in the otherwise Easter lilylike flowers, combined with the graceful narrow leaves that clothe the stems make this lily indispensable as a choice flower in midsummer. Its delicate fragrance in another asset by which it is assured a prominent place in American gardens. The possibility of producing hybrids of this lily are very great because of its seed-producing qualities and the compartive ease with which it can be raised from seed. It has been predicted that it will be the Easter lily of the future, having been successfully forced for that event.—*R. M. Crocket, Cranford, N. J.*

Dutchman's-breeches Poisonous.—At a recent meeting of the Torrey Botanical Club it was reported that the common plant of the Fumitory family known as Dutchman's-breeches (*Dicentra cucullaria*) and its congener the squirrel-corn (*D. Canadensis*) are poisonous to cattle. The poison is said to be most abundant in the "bulbs" as the underground portions are sometimes called. That these plants are poisonous is not surprising when it is recalled that they are rather closely related to poppies, moonseeds, buttercups, aconite, and others with suspicious reputations.

EDITORAL

The United States Civil Service Commission in announcing an examination for scientific assistants requires among other things that applicants shall have a college degree. In this manner does the Commission set the seal of its approval upon the proposition that practical horticulturists, animal husbandmen, dairymen and the like are inferior to the college-made variety. As a matter of fact, college teaching runs so much to theory that the individual who received his training in some practical horticultural or agricultural establishment is often far superior to the man with a degree. It is quite natural that those with college degrees should be prejudiced in favor of others with similar qualifications, but it is manifestly unfair to an immense number of able men who secured their knowledge without being tagged by a university. Some provision should be made to admit to the examinations those practical people who can deliver all the goods but the degree. The attempt to exclude from the Government service in this nation of more than a hundred million people everybody except the college man is a piece of beureaucracy that a free people ought not to tolerate. With reference to the system the *National Republican* well says: "The scheme of selecting government employees by scholastic examinations is so asinine that no private business has ever thought of imitating it. In the stupidity of that method of picking employees the Government stands alone—forced into the position not by public sentiment but by the machinations of theorists." The jobs for

which one must submit a degree and write a thesis, pay from $1350 to $1850 a year. If this is the best that college graduates can do, they would have better taken a course in plumbing or brick-laying.

BOOKS AND WRITERS

The appearance of a second edition of Dr. William Trelease's "Plant Materials of Decorative Gardening", four years after the original volume was issued, is an encouraging sign of the growing interest in living plants. The volume is devoted to woody plants of which nearly twelve hundred forms are enumerated with keys for their determination. This great number includes, of course, practically all the woody plants in cultivation, exotic as well as native. All this is comprised in a volume of 175 pages and has been made possible by the use of the most concise and direct keys. The book is a companion volume to the author's larger work on "Winter Botany" wherein many of the species discussed are figured and more extensively described. "Plant Materials" is a book that the gardner, the nurseryman, the landscape architect and all others who come much in contact with the woody plants can scarcely do without; a fit companion to many more pretentions works on trees, shrubs and vines. The new volume has been throughly revised and brought up to date. It is for sale by the author at Urbana, Ill., for $1.00 postpaid.

Somewhere near the lowest stratum of the plant kingdom occurs an immense group of plants which lack cheorophyll and which, therefore must get their nourishment as animals do, ready made from other living things. Part of this vast aggregation, known as parasites get their food by attacking living plants and animals often causing their death; another and

much larger group, called saprophytes, do not attack plant and animal bodies until dead though they may live on matter excreted by living things. In the latter group there is great diversity of habit and habitat. The minute species often select the most unusual places for growth. One lives in the human ear, feeding on the secretions from its lining, another is restricted to the hoofs and horns of animals. Some occur only on burnt ground and one lives on old rope or paper. Still another lives on wasp nests and a large number grow on the droppings of different animals. Some kinds find their existence limited to a single species and if they do not find this species they do not survive. One is confined to the dead stems of the bullrush another to rotting beech wood, another to maple etc. Other forms have a wider choice of habitats but still are confined to single families of plants as the grasses or cresses. There is still another group of nearly ten thousand species that pass practically half their life cycle on one species of plant and then change to another. A group so large and so varied as the one we have described cannot be adequately presented in a single volume and it is customary for authors to select some division of it for treatment. Among favorite groups for such selection are the bacteria, the yeasts and the mushrooms. In a new volume by Dame Helen Gwinne-Vaughan, professor of botany in the University of London, the Ascomycetes, the Uredinales and the Ustillaginales are discussed. The book is an octavo volume of 230 pages and bears the title of "Fungi". It is one of the Cambridge Botanical Handbooks being issued under the editorial supervision of A. C. Seward and A. G. Tansley. The author has packed into the book an unusual amount of significant material which brings our knowledge of this group of plants up to date. Owing to the technical aspects of the subject the

volume can scarcely be described as entertaining to the general reader, but all who have a working knowledge of the forms discussed will find it very valuable. The general reader with a taste for investigation will find it interesting for the text is clearly written and illustrated by nearly two hundred accurate drawings. The mycolgist will welcome the very extensive bibliography which follows each section. The volume is bound in green cloth and is for sale on this side of the world by The Macmillan Company of New York.

Among the familiar sights of our spring woods are patches of shining red, orange, or white that appear on dead leaves, rotten logs, old stumps and the bark of trees, especially where sap has oozed out. Careful observation of such patches show that they are not fixed to the substratum but move about with a slow streaming motion much like that exhibited by the amoeba. These curious patches consist of masses of naked protoplasm which live like fungi on decaying vegetable matter and are apparently among the lowest forms of life. Scientists are not entirely agreed as to whether these forms should be classed as animals or plants, but from the fact that after a preliminary period of growth, the component parts put on cell-walls of cellulose and form sporangia containing spores they are pretty generally regarded as plants. The group has been variously named Mycetozoa, Myxogasters, and Myxomycetes, but the last mentioned name seems to have the preference. To the field naturalist they are all "Slime Moulds". There are about three hundred species in America but the only botanist who knows much about them is Dr. Thomas H. McBride who has spent the greater part of a lifetime in their study. As long ago as 1890 he published a monograph on the "Myxomycetes of Eastern Iowa" and in 1899, he expanded this into a little book on "North American

Slime Moulds". This volume, which is the only one on the subject, has long been out of print, but it has now been reissued in a new and enlarged form containing 300 pages of text and twenty-three full page plates in which the species are illustrated. A number of new species have been included. In the slime moulds the student is not perplexed by the necessity of a choice between different works on the subject. It is fortunate, therefore, that the only volume is accurate, authoritative and the matter attractively presented. An examination of the book is enough to make the lover of outdoors want to take up the study.

The lupine is now in its glory. It is the most important because it occurs in such extensive patches, even an acre or more together, and of such a pleasing variety of colors, purple, pink, lilac and white, especially with the sun on it when the transparency of the flower makes its color changeable. It paints a whole hillside with its blue, making such a field (if not meadow) as Proserpine might have wandered in. Its leaf was made to be covered with dewdrops. I am quite excited by the prospect of this blue flower in clumps, with narrow intervals. Such a profusion of the heavenly, the Elysian color, as if these were the Elysian Fields. That is the value of the lupine. The earth is blued with it, yet a third of a mile distant I do not detect this color on the hillside. Perchance because it is the color of the air. It is not distant enough. You may have passed along here a fortnight ago and the hillside was compartively barren but now you come and these glorious redeemers appear to have flocked out all at once. Who plants the seed of lupines in the barren soil? Who watereth the lupines in the field?—Henry D. Thoreau.

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HORSE-MINT.—*Monarda punctata*

THE AMERICAN BOTANIST

VOL. XXVIII AUGUST, 1922 No. 3

Fringing the stream at every turn,
Swung low the waving fronds of fern:
From stony cleft and mossy sod
Pale asters sprang and goldenrod.
—Whittier.

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OLD GARDEN FLOWERS—III

THE MONARDAS

NO matter what other treasures the old-fashioned garden might possess, it was never complete without its clump of bee-balm (*Monarda didyma*). Though tucked away in some remote corner, the glowing scarlet of its blossoms served to light up the garden as few others could do; in fact, this plant seems especially designed by nature to grow in masses against a background of other vegetation and to be endowed with sufficient color for all. More permanent than the scarlet salvia, more amenable to cultivation than the cardinal flower and unsurpassed in brilliance of color by either, it is a most satisfactory addition to the garden beds and borders. Even when not in flower it has some claim to our attention for its leaves, permeated with a warm, aromatic oil afford a pleasing fragrance that serves to distinguish it from others of its class as the fragrant balm.

The species of *Monarda* that have been taken into our gardens have been little changed from the wild state, with

the exception of various color forms developed by cultivation. *Monarda didyma* still outlines dripping rocky outcrops with its brilliant blossoms or colonizes sunny glades on the shores of river or lake, *Monarda fistulosa* spreads in solid sheets of lavender over hundreds of square miles of prairie, and *Monarda punctata* gives to the sandy wastes an air of cheerful thrift in spite of heat and drowth.

The flowers of the monardas are slender, curved and two-lipped. Though individually of no great size, their habit of growing in compact little rosettes at the tips of the stems make them quite conspicuous. In this they are helped out by the floral leaves or bracts which commonly take on something of the colors of the flowers themselves. In the case of *Monarda punctata* shown in our illustration, this has gone so far that the bracts have become the most conspicuous parts. The flowers are rather insignificant, yellowish in color and spotted with purple within, but the bracts are large, white or purplish and most attractive.

As might be expected, the scarlet forms of *Monarda* are most sought after for cultivation. Of these, the bee-balm or Oswego tea (*M. didyma*) is easily first. Various other red and purple forms are found in the dealers' catalogs as forms of *Monarda fistulosa,* but these are regarded as seperate species at present. As usual, white forms are also to be obtained. True *Monarda fistulosa* has lilac or pink blossoms. The horse-mint (*Monarda punctata*), though not as brilliant as its sisters is still an attractive plant, especially desirable for dry grounds where few other things will grow. *Monarda clinopodia* is a species of no great attractiveness which ranges south to Georgia. It has whitish flowers and is seldom cultivated.

The Monardas will grow in any good garden soil, in either sun or shade but thrive best when given a sunny situation and plenty of water. The species are easily propagated by divisions of old clumps in fall or spring.

GARDENING IN AN ARTIFICIAL BOG

By Henry Bird, Rye N. Y.

MANY of our native wild flowers take kindly to horticultural uses and landscape architects are recommending natural plantings to a degree never equalled before. To secure the acme of result in such way requires much skill and experience, but the successes are being duly appreciated. Not a few of the acid soil plants and shrubs are valuable in this line, but they are tabu except when their transference happens to be to a situation closely resembling their original habitats. The true bog plants have much to recommend them in some instances but success in their case requires an understanding that makes appeal to botanists rather than others.

Mention of the successful transplanting of trailing arbutus and the northern pitcher plant recently in this magazine, indicates that commendable human attribute which ever seeks to do the difficult and unusual. The writer's efforts in the artificial acidulation of soils has found outlet in the production of an artificial bog which may appeal to botanists and is not without artistic possibilities in its horticultural developement Arbutus and *Sarracenia*, woodland orchid types and the swamp *Helonias*, sundews and gentians, may be brought together in the space of a few square feet in a manner one never

sees quite duplicated in nature. It is not difficult to grow all the *Sarraceuias* in the latitude of New York City, and if a majority of these species be represented and made to form a principal feature of the planting, a pleasing result is assured. To be able to follow these interesting types, have them bloom and exhibit their anomalous features of entrapping insects while at the same time others find immunity and their sole habitat within these wonderfully adapted pitchers, in ones own garden, is a privilege, and the trouble in the beginning is soon forgotten in subsequent gratification. The recent work of Jones, Hapburn and MacFarlane in checking up the old and adding new data on the many sided question involved in these plants takes on a new meaning when such striking types may be seen standing one beside the other. And of this category it is always of interest to point to *Dionaca muscipula*, that plant characterized by Darwin as the most wonderful in the world.

To enhance an extension of the environmental or ecological possibilities of the suggested bog, the aim has been to produce an acid content where such plants as *Sphagnums* and sundews for moist types, and *Fissipes acaulis* of drier ones, plants usually associated with maximums, may get on with what may be their minimum requirements, thus allowing a condition of limited acidity, open to a vast number of species.

While the plants themselves act in a large measure as indicators of their acid requirements, the work of Wherry in computing the entended data he has given us, simplifies and suggests much that may be done in this line. It may seem anomolous to bring together plants redolent of moisture in juxtaposition with those of thin soil or well drained situations; to comingle habitats as divergent as Canada and Florida, but it only demonstrates that moisture and temperature lose much

of their significance when a sufficient acidity is met.

An experimental bog may be no larger than an area six by nine feet. It should copy the natural bog in being an entrapped drainage area; be sheltered thru depression; secure an "acid" content by the use of the tannin residues such as the commercial extracts of oak or hemlock bark, as they come in concentrated form prepared for the tanning trade.

These bark extracts dilute readily in water, contain a very minute percentage of acid, but seem to develop a rather marked amount as their constituents undergo chemical change in moist soil. Thru a continuous supply of the tannin, favorable conditions arise for growing the more pronounced types of so called acid soil plants, and because of this, at a degree much less than that of their usual habitats. That is, the tests by the Wherry method using the LaMotte indicators, show we may grow arbutus, pink lady slipper and buckbean for instance, at thirty points or less beyond neutral, whereas one rarely finds a natural station for them except it be well beyond that point.

For such a six by nine planting we recommend the following procedure. Select some situation in full sun, and excavate an area of seven by ten feet down to a depth of three feet. At the bottom a saucer of puddled clay must be formed, two cubic feet of such material being needed. Having donned rubber boots and moistening the clay at intervals it can be trodden into proper consistency, about that of a stiff putty. It may then be shaped into a saucer with a mason's trowel to a thickness of ten inches with edges arising as perpendicularly as possible on the inside, and its finished periphery conforming to the six by nine feet required. The edges should run up so that there is a depth of about sixteen inches in the center

of the saucer, and when thoroughly dried out the basin may be filled with sand and wood soil, two parts to one respectively, finishing the surface so that the center is four inches lower than the sides. Since this level is yet about a foot below the ground line an arrangement of planking like a hot bed frame should be built to hold the adjoining soil and keep out surface water. With such a wooden coping the southern plant life can be protected by three hot bed sashes in winter, and lath screens be applied in very hot midsummer weather or on occasion of damaging windstorms.

In applying the bark extract, our plan is to sprinkle once a week or oftener at the start, using one half pint of the extract diluted in ten or twelve gallons of water. If this quantity of extract is mixed in two quarts of tepid water first, a better suspension is obtained. Other waterings may be with the garden hose—the bog is never expected to maintain standing water, but must always be thoroughly moist.

From its concave surface most moisture will accumulate at the center of the bog, and here sundews, pitcher plants, etc., should be placed, while the sides can support the drier types. Of course water that is decidedly limey should be avoided and no fertilizers countenanced. The earthworms will soon become established and help build up humus, and in transplanting, the introduced plants should have plenty of soil about their roots, thus bringing in bacteria that thrive where tannin abounds.

As to adaptable plants, the list is large. Due to restricted area, small and low-growing ones must be used and if in addition to a botanical experiment the artistic possibilities be considered, the Orchidaceae at once suggest themselves. The more adaptable of these like *Cypripedium parviflorum* may

luxuriate in two seasons as we have seen, from a three crown plant to one supporting twenty six flowering stems. When this and its immediate relatives hold sway, a floral effect is easy. Following this array, the *Sarracenias* become in evidence, first with their peculiar flowers and for the remainder of the season their pitchers form a dominating feature. *Drummondii* and *flava* are very effective and though not so robust as in southern climes, their pitchers attain a height of nineteen to twenty inches at Rye. A congeniality for mosses and ferns abounds but we have restricted the single species *Lorinseria arcolata* for a border fringe to hide the woodwork.

The following list of plants are those most conspicuous with us, are luxuriating normally, have for the most part flowered and show a commingling of types which point to the extent acidity may bridge differences of moisture and gaps of isotherms.

Sphagnums and other mosses
Camptosorus rhizophyllus
Lorinseria arcolata
Juncus effusus
Lycopodium complanatum
L. lucidulum
L. olscurum
Xyris sp.
Coptis trifolia
Cypripedium reginae
C. parviflorum
Fissipes acaulis
Galeorchis spectabilis
Gymnadeniopsis integra
G. clavellata
Limnorchis dilatata
Blephariglottis ciliaris
B. blepharigottis
Limodorum tubersum
Ibidium strictum
I. gracile
Helonias bullata (Delaware)
Clintonia borealis
Hepatica acutiloba (Can.)
Bicuculla cucullaria
Sarracenia purpurea
S. flava (S. C.)
S. Drummondii (Fla.)
S. minor (S. C.)
S. rubra

S. psittacina (Fla.)
Drosera rotundifolia (Fla.)
D. filiformis, var *traceyi* (Ala.)
Dionaea muscipula (Carolina)
Silene caroliniana
Sedum ternatum
Heuchera sp.
Rubus hispida
Epigaea repens
Gaultheria procumbens
Viola lanceolata
Rhexia virginica
R. mariana
Chimaphila maculata,
C. umbellata
Kalmi latifolia (seedlings)
Gaylussacia brachycera (from primitive Penna. plant)
Vaccinium sp.
Oxycoccus macrocarpus
Sabbatia sp.
Gentiana crinita
Dasystephana andrewsii
Menyanthes trifoliata
Mitchella repens
Houstonia coerulea
Shortia galacifolia
Ionactis linarifolius
? *Coreopsis* sp. (adventive seedling from Fla.)

BOTANY FOR BEGINNERS III.

By Willard N. Clute.

THE whole subject of plant growth seems an inscrutable mystery to the average individual. He is wont to imagine that plants spring out of the earth much as wool grows on a sheep, entirely overlooking the fact that plants are living things derived from pre-existing individuals and therefore more or less related and not the product of natures vagaries. It is a common failing for him to regard any unusual flower he encounters as the only one of its kind or, if instead of a single plant, a colony is discovered, he is disposed to insist that his is the only place in the world where the plant grows.

The American lotus or Nelumbo is often credited with this kind of distribution, or rather, lack of it. The plant is so remarkable in both leaf and blossom as to attract the attention of everybody who approaches it and its comparative rarity naturally leads to unwarranted conclusions.

To be sure there are various plants that inhabit very limited portions of the earth's surface. The Venus' fly-trap, for instance, is found only in the North Carolina marshes near the coast, and the insectivorous *Darlingtonia* is known only from the sierras of California and Oregon, but most plants are more widely distributed. Nor is such distribution hap-hazard or disconnected. Each kind of plant has a definite range that in the case of all ordinary forms can be indicated with considerable exactness. In general, plants are supposed to have spread outward from their point of origin until they encountered some barrier to their further progress, and thus are confined to very definite areas. There are, however, certain phases of distribution that have ever been a puzzle to botanists. Among these are the occurrence of colonies of the hart's-tongue fern in central New York and in Tennessee but nowhere else in America. The plant is common along ditches and hedge banks in England and the question is still how the colonies arose in the Western Hemisphere. Another fern *Asplenium alternans*, is found in a single canyon in Arizona and not encountered again until the Himalaya mountains are reached, more than ten thousand miles away! In some cases, when there are outlying colonies at a distance from the main body of the species there is evidence to show that the species was once more widely distributed and has since contracted its area, but in other instances the species may be extending its range into new territory. Reports of

plants far beyond their known limits are now matters of frequent occurrence. Classic illustrations of the extensive spread of species in historic times may be found in the behaviour of the prickly pear in Australia, of the water-weed (*Elodea*) in Europe and of the prickly lettuce and Russian thistle in our own country.

Sooner or later, the most persistent species must reach a barrier that limits its further progress. Such barriers are naturally most diverse and their importance often depends upon the species, for what constitutes an insuperable barrier to one species may prove to be no hindrance to another. An extensive forest may bar the spread of plants that thrive on plains or prairies, and a desert or large body of water be an efficient barrier to woodland forms. Indeed, the desert might limit the forest while offering new regions for colonization by plants of the plains.

The effect of temperature on the distribution of species is a familiar one, for we see a cold period annually put an end to many kinds of tender vegetation and realize that the northward extension of any species must ultimately be limited by the cold. That an increase in temperature may prove harmful to other species is not so well known but a consideration of the plants of the world show an immense number that cannot endure any great increase in temperature and when brought into milder regions die because the weather is too warm. We may even account for the fact that the tree flora of Europe is not as rich as our own by a matter of temperature, for it is known that the last great ice-sheet which covered the northern hemisphere pushed the plants southward until they were stopped by the mountain chains across their path and thus obliged to perish, while in our own country the north

and south trend of the mountain ranges allowed our plants to elude the ice sheet and to migrate back into territory formerly inhabited after the ice sheet had retreated.

It not infrequently happens that one species is limited in its distribution by its dependance upon another species. Fungi and such parasitic flowering plants as the dodders and some orchids cannot, of course, be distributed farther than the range of their host plants. The chestnut blight must come to an end as soon as all the chestnuts and chinquapins are destroyed unless it learns to live upon some other species in the meantime. Even more curious are those ranges that are modified by insects which pollinate the blossoms and thus ensure a continuance of the stock. The yucca and the yucca moth, for instance, are so closely interdependent that one cannot long survive in a locality or spread into new regions, without the other. It thus happens that the draining of a swamp or the cutting down of a woodland in one part of the country may destroy the feeding grounds of some insect that aids in maintaining a very different species in some other area.

It is only in recent years that we have come to realize the important part the soil plays in the distribution of plants, but we now know that vegetation can be divided into two great groups depending upon whether they are tolerant or intolerant of acid in the soil. Most plants especially the common plants of our gardens, do not thrive in a soil that is acid, but many others absolutely refuse to grow in any other. The rhododendron, azalea, huckleberry and trailing arbutus belong to this group, not to mention various water ferns, violets, and bog-plants generally. It is apparent, therefore, that it is not mere accident that determines where a plant shall grow. Each species does the best it can under the circum-

stances and occupies as much territory as it can conquer for itself. But often fine and, in many cases imperceptible differences in soil or climate make an area unfitted for the survival of a given species though in no wise inhabitive to some other. Thus have come about the willow thickets, walnut groves, oak forests, berry patches, alder swamps, sphagnum bogs, wintergreen colonies and many more. Even one who has had no botanical training recognizes the difference between two such regions though often unable to state it in words. He does not hunt for pitcher plants on hillsides nor for sassafras in swamps. Among the upland forests of pine, oak, and hemlock we may find arbutus, sweet-fern, wintergreen, and huckleberries, while in the maple-covered lowlands grow the bloodroot, hepatica, violet, and phlox.

Although each species is at present spread as far as possible in every direction, various natural agencies may at any time open new fields for further colonization. The great barriers of the earth, however, such as mountain chains, deserts, oceans and the like ultimately divide vegetation into fairly distinct groups. Thus the flora of the Northeastern States differs in its major aspects from that of the Gulf States, as both differ from the flora of the Pacific Slope or of the Great Plains. But while a given species rarely extends far beyond the boundaries thus set, it is the usual thing to find other species very much like it in adjoining regions. It is likely that all may have arisen from a common stock at some time long in the past, but in adapting themselves to different conditions have taken on different characteristics which forever distinguish them.

IMPORTANT MOVEMENTS OF PLANTS-II

By John J. Birch

CIRCUMNUTATION OF ROOTS

NOT only do the stems, leaves and stolons circumnutate but the radicals, hypocotyls and epicotyls of the seeding plants as well, even before they emerge from the ground. In all germiating seed, the first change is the protrusion of the radicle, which immediately bends downward and endeavors to penetrate the ground. There is a movement of the root tip which bores thru the soil and in this way makes a place for the root. Then as the root grows and fills up the hole, the cells become more numerous and exert a pressure on the side sufficient to force the earth away, and in this way, due to the close packing of the earth around the root, it is able to come in direct contact with materials for growth. The movement of the radicle, also guides it along the line of least resistance as when the root happens to break obliquely into cracks or into burrows made by earth worms or larvae. This movement, combined with the sensitiveness of the tip to contact, is of great importance, for as the tip is always endeavoring to bend to all sides it will press on all sides, and thus be able to discrimate between the harder and softer abutting surfaces, thus guiding the root. Consequently it will bend from harder soil to the softer soil, materially aiding the plant.

There is no structure in the plant more wonderful, as far as its functions are concerned, than the tip of the radicle. If this be lightly pressed or injured it transmits an influence to

the upper parts of the root, causing a bending away from the affected side. The tip also can distinguish between slightly harder and softer objects to a marked sensibility. One might compare the tip of the radicle to the nervous system of animals.—it receives the impressions and then by some marvelous methods directs the organism.

Several other factors which will be discussed later are active in determining the direction of growth. In almost every case however, the final purpose or advantage of several movements is obviously for the life of the plant.

After the radicle has penetrated the soil, the hypocotyls of the dicotyledonous seeds break up thru the ground in the form of an arch. When the cotyledons are hypogean, that is, remain buried in the soil, the hypocotyl is hardly developed and the epicotyl or plumule raises in an arched manner.

The cotyledons after they have broken thru the ground are in constant motion, chiefly in a vertical plane and commonly once up and down in the course of twenty four hours. However, there are many exceptions to such a simplicity of movement. Their upward and downward movements do not exactly conicide, therefore generating an ellipse. In many cases it is found that the cotyledons sink downward a little in the forenoon and rise in the afternoon or evening. Thus they stand rather more highly inclined during the night than during the mid-day, at which time they are expanded almost horizontally. The circumnutating movement is thus at least partially periodic, no doubt in connection with the daily alternations of light and darkness.

The conclusions reached from the study of circumnutation is that it was not gained for any special purpose, because it is so universal a phenomena; but that it follows in some unknown way from the manner in which vegetable tissues

grew. As more powerful agents, such as light, dampness, obstructions, gravitation, etc. exert their influences the plant becomes susceptible thereto and in this way, new movements were developed, which have become hereditary and necessary for the well being of the plant.

ESPINASTY MOVEMENTS

When the growth is greater longitudinally along the upper than along the lower side of the part, causing a downward bending, the term espinasty is used. The reverse of this is expressed by hyponasty. These are in reality modifications of circumnutation, but because they are so often referred to, the special terms were designated to express them. The organ, under the influence of epinasty does not move downward in a straight line, or upwards under the influence of hyponasty, but oscillates up and down with some lateral movement. However, the preponderant movement is up and down. There is some growth on all sides of the part, but more on the upper in the case of epinasty and more on the lower in that of hyponasty. There may be an additional growth on one side due to geotropism and on another side due to heliotropism, thus increasing or decreasing epinasty or hyponasty.

One of the commonest cases of epinasty is that offered by leaves which are crowded together round the buds at an early age and diverge as the plant grows older. It was believed that this is due to increased growth along the upper side of the petiole blade. As the hypocotyl and epicotyls of some plants protrude from the seed coats in an arched form, it is doubtful whether the arching through the ground ought always to be attributed to epinasty; but when it happens that they are first straight and afterwards become arched, it is in that case certainly due thereto. The arch must retain its

form when surrounded by soil; but as soon as it is freed from that pressure, or rises above the ground it begins to straighten, by the force of hyponasty.

HELIOTROPISM AND GEOTROPISM

The sun is one of the most vital agencies active on plant life. Stems and leaves behave very differently in relation to the direction of light. The stems grow toward the light and the leaves arrange themselves so that the upper surfaces are perpendicular to the sun's rays. Just the reverse of this is the case with the roots; they grow away from the light. This process of auto-turning is called heliotropism. Parts which turn towards the light are described as positively heliotropic, while those which turn away are negatively heliotropic (apheliotropic) and those which turn across as transversely heliotropic (transheliotropic). There is a fourth case which might be included under heliotropism. The leaves of some plants when exposed to an intense or injurious amount of light, protect their leaves by twisting or rolling them. This is especially noticeable in dry wheather when the plant seems to conserve its moisture by every way possible. Such movements are sometimes called diurnal sleep or paraheliotropism.

When a plant is exposed to a lateral light the stems move at first in a zig-zag line, which is undoubtedly due to its circumnutation at the time, in a direction either opposite to the source of light or transverse to it. As soon as the direction of circumnutation nearly coincides with that of the entering light, the plant bends in a straight line towards the illumination. The course becomes more and more rapid and rectilinear in ratio to the intensity of the light and ellipses tend to have a greater ratio of diameters.

Heliotropism prevails so extensively among the higher plants that there are extremely few of which some part does not bend towards a lateral light. The insectivorous plants are exceptions to this; for it is obvious that they do not live chiefly by decomposing carbonic acid, but it is of more importance to them that their leaves should occupy the best position for capturing insects. Also the stems of twining plants are rarely heliotropic for if they had a tendency to move towards a lateral light, they would be drawn away from their supports. Most tendrils are apheliotropic and thus find supports.

Paraheliotropism has undoubtedly been acquired for a definite purpose. The chlorophyl of leaves is liable to become injured from too much light, and it is believed that it is protected by the most diversified means, such as the presence of hairs, coloring matter, and amongst other means, by the leaves presenting their edges to the sun so that the blades receive the smallest amount of light. It is very probable that this movement has been acquired for the special purpose of avoiding too intense illumination.

It is of paramount importance to the chlorophyl manufacture that the leaves get all the sunlight possible. As it falls on the sensitive protoplasm of the plant, the light sets up, probably by chemical means, a condition of irritation or strain which puts the side toward the light in a condition different from the side away from it, thus favoring the chlorophyl process. This is well shown by the plants growing on a bank or on the borders of a wood. The trees send their greater number of branches towards the open, and in the case of plants growing on a bank, the leaves are so mosaicked that they are not one on top of the other, but each is so arranged that the greater area is presented to the sun. Some botanists have advocated the idea that the angular shape of

such leaves as those of the English ivy are partly determined by the advantage of interlocking to use all the space.

Flowers are extremely heliotropic. They turn their faces directly towards the light that they may receive all the rays of the sun. Some flowers follow the sun through the day, although the adjustment is only moderately effective. Although there is no chlorophyl process active in the flower, yet it becomes evident that if it is to be attractive to insects, the function of conspicuousness requires that the corolla stand out where the light strikes it most fully. As to fruits, they are indifferent to light, which may be due to their weight. However, most fruits are on the ends of the branches where they receive the most light, and it is probable that the amount of sunlight affects the fineness of the fruit as regards size, flavor and beauty.

ASPIDIUM LASERPETIIFOLIUM IN PENNSYLVANIA

By James Grimshaw Scott

EVER since the discovery of *Asplenium ebenoides*, R. R. Scott in the Schuylkill valley, Pennsylvania, the botanical denizens of the States have been on the lookout for a new specimen of fern that might perchance eclipse it in importance and perpetuate their names in botanical annals.

Recently, Charles H. Pettiford, gardener for W. S. Pilling has found growing in the enchanted wild garden on the Pilling premises in Germantown, an exotic fern that seems to have become thoroughly Americanized in the happy en-

vironment of this notable collection of indigenous plants though which one of the tributaries of the Schuylkill river flows.

ASPIDIUM LASERPETIIFOLIUM.

After repeated efforts to have some local botanist name the fern it was sent to the Smithsonian Institution and the Bronx Botanical Gardens for indentification. Both of these authorities agreed in naming it *Aspidium laserpetiifolium*, Mett. and the specific name so much resembles that of its re-

discoverer, we may call this domesticated fern Pettiford's shield fern for purposes of introduction and general discussion.

Mr. Pilling has found among the nurserymen of the vicinity a "commercial" fern somewhat similar to his specimen bearing the name of *Aspidium viridescens* but it has none of the vigor and beauty of the plant growing in the Schuylkill wild garden. The nurseryman's fern appears, in comparsion with the domesticated specimen, to be drawfed and stunted in growth so that the casual observer would not recognize the two to be of a common origin. One is artificial, the other natural. The oriental variety is a species of eastern Asia extending from Tonkin to Japan. Diels lists it as *Polystichum lasercpetiifolium,* but Christiansen takes up the earlier name of Moore's and calls it *Polystrichum Standishii* (Moore) C. Chr. It was transferred to *Dryopteris* by Otto Kuntze in 1891 and is in fact, one of the comparatively few species exactly intermediate between these two genera, in this respect resembling *Dryopterris denticulata* (Swartz) Kuntze of tropical America which is often placed in *Polystichum.*

In habit the plant is somewhat polystichoid and for that matter the indusium also suggests *Polystichum* although it is actually orbicular-reniform and attached distinctly to the sinus rather than being centrally peltate. The fern is a handsome one in cultivation and in pursuit of the new policy of the American Fern Society to feature exotic ferns, we commend this splendid plant to their early consideration.

PLANT NAMES AND THEIR MEANINGS—XII

LABIATAE

By Willard N. Clute

THE species included in the Labiatae are very distinct in appearance. The square stems, aromatic foliage, and flowers in clusters in the axils of the leaves or in a spike at the summit of the stem set them off from other plants and make them easily recognized. The group was naturally among the first to be distinguished when the relationships of plants began to receive notice. The flowers, which usually face sidewise, are two-lipped or "labiate" and from this circumstance the family name is derived. It is to be observed, however that the designation Labiatae is not founded on the name of a genus and according to some botanists should give way to one that is, for instance, Lamiaceae. This latter name has as yet found little favor. The family is occasionally know as the Menthaceae a title which should prevail if fitness be considered for *Mentha* is the name of the mint genus and mint is the commonly accepted name for the whole group.

The Labiatae abound in showy flowers and in keeping with this fact several genera have names which refer to the blossoms. At the beginning we may introduce *Isanthus* which is formed from the Greek *isos*, equal, and *anthos*, a flower, because the flowers are nearly regular instead of two-lipped as is usual in this group. *Ajuga*, from *a*, without, and *jugum*, a yoke, refers to the fact that the flowers of this genus appear to lack an upper lip to the corolla. *Lophan-*

thus, the name by which the giant hyssop was once known, means crest and flower and alludes to the dense terminal flower-spikes. *Agastache*, the term by which the genus is now designated, has somewhat the same meaning being derived from words meaning much and an ear of corn (wheat). The latter half of the name may also be translated to mean flower-spike as in *Stachys* the name of the hedge nettle. *Pycnanthemum* means "dense blossom" in allusion to the compact inflorescences of this genus.

The genus *Lamium*, from which the family name Lamiaceae is derived, is by some assumed to come from the Greek for throat, in reference to the open or ringent corolla. Wood, however, says that the name comes from *Lamia* the name of a sea-monster "to which the flowers may be likened." Botanists have seen other resemblances in the flowers of this family to various animals, fabulous and otherwise, as in *Dracocephalum* which is literally "dragon-head". *Leonurus* means "lion's tail" and *Galeopsis* comes from two words signifying weasel and appearance. Lycopus, means wolf's foot and refers to the leaves of the plant. *Melissa* also refers to an animal but the reference is suggested by its attractiveness for bees—*mel* is Greek for honey—rather than from any resemblance of the plant to bees.

Scutellaria is from *scutella*, a dish, in allusion to the shape of the calyx, and *Trichostemma* is from Greek words meaning hair and stamen and refers to the slender filaments. *Physostegia* means "bladder" and "a covering" and is said to have been bestowed on our species from the fact that the calyx becomes somewhat inflated in fruit. The sterile cells of the anthers in *Synandra* cohere, hence the name from words signifying "together" and "anther". The hairy fringe on the

bracts and calyx teeth of *Blephilia* account for its name from a word meaning eyelash.

Genera in the Labiatae dedicated to botanists are not numerous, but we must not overlook *Monarda* which commemorates Nicholas Monardes or Monardus a Spanish botanist who lived in the latter part of the sixteenth century and wrote many pamphlets on useful plants, especially those of the New World. There is also *Collinsonia*, named for Peter Collinson an English botanist of the time of Linnaeus, who did much to make the plants of Eastern America known. J. S. Elsholtz, a German physician of the 17th century is remembered in *Elsholtzia* a genus with certain half-shrubby forms quite unusual among labiates. *Meehania* is the name given to a group set off from *Cedronella* to commemorate the name of Thomas Meehan one of the most acute and learned botanists of recent years. Nor must we forget *Teucrium* which bears the name of that ancient Teucer who legend says was founder and king of Troy. He is reputed to have been the first to use the plants of this genus medicinally. The true mint genus, *Mentha* is dedicated to a wholly mythical personage, *Minthe*, who according to Theophrastus was a nymph which Proserpone turned into a mint plant. *Perilla* is a Greek and Latin proper name.

As usual, there are, in this family, a number of generic names whose derivation is unknown or uncertain. One of these in *Cunila* the name of the dittany. Wood says this is an ancient name for the pennyroyal. The generic name of the black hoarhound, *Ballota*, means according to the same author, "to reject," on account of its vile odor. *Satureia*, the name of the summer savory is said to be the ancient Latin name which Wood says is derived from the Arabis *satur*.

a term used for labiates in general. *Hyssopus* is another ancient name which is said to be derived from the Hebrew *ezeb*. From the same language comes *Marrubium* from *marrob* "a bitter juice". The name was first used by Pliny. The catnip genus, *Nepeta,* is by some said to be derived from Nepet or Nepete an Etruscan city. *Phlomis* is the old Greek name for some woolly plant. Wood says that the woolly leaves of *Phlomis lychanitis* were anciently used for lamp-wicks, a use which the specific name indicates.

The genus *Glechoma,* by which a section of the catnip genus is sometimes known signifies thyme or pennyroyal in the Greek. Both of the species mentioned have names that refer to their aromatic qualities. *Thymus* is an old word for perfume which is reputed to have been given to our plants because of their use in incense, though Wood says the name is derived from *thymos,* courage, from its invigorating smell. The pennyroyal genus is *Hedeoma* from the Greek *edos,* sweet, and *osma,* smell. Originally this is said to have been the name of the mints. *Ocimum* is another generic name derived from the Greek *osma.*

In so useful a group as the one under discussion, there would naturally be a number of generic names derived from their healing or other properties. One of the most familiar is *Salvia* the name of the sage genus from the Latin *salvare,* to save. Then there is *Lavendula* from *lavare,* to wash, in allusion to the well-nigh universal association of lavender with clean clothes. *Prunella* is a modern spelling of *Brunella* a name given to the self-heal from the German *braune* meaning quinsy, which this herb was reputed to heal. Linnaeus gave sanction for spelling the name *Prunella,* though whether by design or a typographical error seems uncertain.

When once a mis-spelled word becomes current, however, changing it becomes a weighty matter. Such are the ways of botanists.

The rosemary genus, *Rosmarinus* may be mentioned here to point out another error into which plant students sometimes fall. This plant, though called rosemary, has nothing to do with the Virgin. It is really *ros*, dew and *marinus*, the sea. In the labiates, also is found the genus *Betonica*, probably the original of that word "betony" which is often applied to various other plants of different affiliations. *Calamintha* is literally "beautiful mint" and *Origanum* is "mountain joy" or "mountain ornament." *Clinopodium*, formerly used for some of the plants now placed in the genus *Saturcia*, is Greek "bed-foot" because the flowers are like a bed-caster. It is possible that the plant which origininally bore the name had some resemblance to the article mentioned but it is difficult to see any resemblance to it in our species.

Although the entire group of labiates are commonly called "mints" only a few of them are mints in the sense of belonging to the genus *Mentha*. Most of the other members of the family, however, are so pervaded by the warm aromatic mint-like flavor that it is most natural to regard them as mints, also. The most distinguished of all the true mints is probably *Mentha spicata*, a rather insignificant plant as appearances go, but one that is celebrated in song and story as an all-important accompaniment of roast lamb and as an indispensable ingredient in a beverage which only a Constitutional amendment could banish from public life. Now, falling on more prosaic days, its principal use in in flavoring chewing-gum. As an ingredient in mint-sauce, it has acquired such names as "lamb's mint", "garden mint", "mackerel mint",

"common mint" and probably, "sage of Bethlehem.". "Our Lady's mint" is doubtless a name testifying to its high repute, since only plants of great excellence were dedicated to the Virgin. The name of "spearmint," by which the plant is most commonly known refers to the spire-like inflorescence. The plant was once known as *Mentha viridis* and from this circumstance the plant is occasionally called "green mint".

Second only in importance to the spearmint, comes *Mentha piperita,* well known from its biting flavor as "peppermint", but also called "lamb's mint" and "brandy mint" from which we assume that it occasionally served in place of its more popular relative. Both *Menth longifolia* and *M. aquatica* are known as "water mint" and "fish mint", probably for their fondness of water, though all the mints are found in wet places. The first mentioned is also "brook mint," and "horse mint", the latter name doubtless referring to its coarse or less attractive qualities. *Mentha rotundifolia* is also "horse-mint" and "wild mint". The meaning of "apple mint" and "Patagonia mint" applied to this species is not clear, but since practically all our mints are of Old World origin and brought their common names with them when they settled with us, they may have more significance abroad. The only species native to both sides of the ocean is *Mentha arvensis* which is known as "field mint" and "corn mint" for growing in cultivated grounds, as "wild pennyroyal" for its odor, and as "lamb's tongue" for its occassional use in sauces. The variety *Canadensis* is sometimes called "American mint", but rarely on this side of the world. *Mentha citrata* is the "bergamot mint". The true bergamot is a member of the citrus family which the orange and lemon belong and the common name of our plant clearly shows it to be a translation of the specific

one. Both were probably given for the lemon-like odor.

Other plants called bergamots belong to the genus *Monarda*. The species most frequently called "wild bergamot" is *M. fistulosa* but the specific name of *M. citriodora* marks that species as best entitled to the name. Instead, the latter is called "lemon mint" and "lemon monarda" which simply states the same idea in different words. *Monarda fistulosa* is a conspicuous member of our flora, able to endure poor soil, and putting up numerous heads of showy lavender flowers. It is sometimes called "Oswego tea" but this name is understood to be better applied to *Monarda didyma*, a plant with flower-heads very similar in shape but of so vivid a red as to rival those of the imperial cardinal flower. It has received a variety of common names but "bee balm" is the one usually heard. Nearly as common is "Oswego tea" the latter half of the name given because the leaves were sometimes used in infusions, but why this tea is associated with Oswego is a puzzle. Among its other names are "mountain mint", "red balm," "low balm", "fragrant balm" and "Indian plume", the last probably a mere book name. "Horse mint," a title sometimes given to this species is more commonly applied to *M. punctata*. This latter species is also called "rignum" which is manifestly a contraction of *Origanum* a genus to which it is wrongly referred. *Monarda clinopodia* is the "basil balm" though Britton's Manual spells the first word *basal*. The name means royal and belongs properly to the species of *Ocimum*. "Balm" is itself a contraction of balsam.

Several species of *Satureia* are also called "basil.". The one most frequently so named is *S. vulgaris* which is "wild basil", "field basil" and "stone basil". This species is also called "bed's foot" a translation of *Clinopodium* the generic name once used for certain members of this group. "Dog

mint" may refer to its inferior qualities while "field thyme" and "horse thyme" are doubtless names to distinguish it from the true thyme (*Thymus serpyllum*). *Satureia nepeta* is the "basil thyme", "field balm" and "calaminth" or "calamint". This last term is derived from still another generic name *calamintha* which some of the species have borne in bygone days. It means "beautiful mint". *Satureia acinos* is another "basil" or "basil balm" and also "mother of thyme," and "polly mountain" applied to the true thyme is a distortion or reference to pennyroyal. *Satureia hortensis* is the "summer savory" of our gardens whose aromatic leaves are much used for flavoring soups and dressings.

The name of "mountain mint" applied to *Monarda didyma* suggests a confusion of this plant with *Pycnanthemum Virginianum*. When in leaf, only, the two species are, indeed, very much alike, but in flower no one could mistake them. *Monarda* may often be found in elevated places, especially if wet, but the present species is so plentifully distributed in rough country as to be fairly entitled to be considered the true mountain mint. The looseness with which identical terms are applied to a number of plants when there is only a passing resemblance between them is seen in the present instance when our plant is also called "basil", "pennyroyal", "mountain thyme", and "prairie hyssop." These names are of course, explained in their proper places.

In dry and elevated regions a strong and pungent odor often apprises one of the presence of *Hedeoma pulegioides* commonly known as "pennyroyal". Though so familiar to us by this name, it has really usurped the cognomen of a European species (*Mentha pulegium*) regarded as the true pennyroyal. The specific name seems to have been derived

from *pulex* meaning a flea. From *pulegium* it became *puleium* then *puliall* or *poliol* and finally "pennyroyal". The American plant is naturally known as "mock pennyroyal" and "American pennyroyal." It is also called "squaw-weed" from its use as medicine by the Indians. "Tickseed" probably refers to its use against insects. The oil is a well known defense —if such there be—against mosquitos.

Our only species of thyme is *Thymus serpyllum*. Unlike most other plants it does not derive its common name from the generic name for it was known as *thymus* long before scientific names came into fashion. As we have already noted, the word has some connection with incense, as well it might, considering the plant's aromatic odor. It is also called "creeping thyme", "mother of thyme" and "shepherd's thyme". "Penny mountain" connects it with pennyroyal and "hillwort" possibly refers to its growth in broken country. This is the species to which Shakespeare alludes in:

"I know a bank
Whereon the wild thyme grows."

ADDITIONAL PLANTS NAMES

THE series of articles on "Plant Names and their meanings" now running in this magazine is designed to serve two purposes. In the first place it is desired to put into connected form an explanation of current common names for the benefit of those who have not the time to look up this information for themselves, but in addition it is hoped that the series may bring out further notes and suggestions. That this latter hope is being realized is shown by the responses

from our readers. Scarcely a single number has been issued that did not bring us additional information. Incidentally, it may be said that the articles have attracted considerable attention in many parts of the world and inquiries for them have been received from such remote regions and the Cape of Good Hope, India, China, and Russia.

Several additional names in the Ranunculaceae have come to light since the notes on that family were published. We note that the hepatica is occasionally called "blue anemone", a name that is fairly descriptive. *Myosurus minima* has the singular name of "blood strange". This seems to be derived from the Latin *stringendo*, to staunch, and thus gives some meaning to the name though it is scarcely appropriate. We also missed another change rung on the columbine, in "culverwort". Culver is an ancient name for dove, just as *columba*, in the Latin, means dove, and *columbina*, dovelike. In Vaughan's seed catalogue *Aquilegia Canadensis* is listed as "Turk's-cap". This may be in allusion to the spurs of the flower though it scarcely deserves to be called a common name. "Akely" is a vernacular name originated in an attempt of the unlettered to pronounce *Aquilegia*. *Clematis ligusticifolia* is reported as "hill clematis" in "American Honey Plants" but the plant is not especially partial to hills. The name of "poor man's rhubarb" ascribed to species of *Thalictrum* appears to be based on the fact that the root of one species may serve on occasion in place of the officinal rhubarb. *Aconitum napellus* is a European species of "monk's-hood", commonly planted in gardens. It may be of interest to note here that the curiously shaped flowers have received other names such as "friar's cap" which is much the same as "monk's hood", "soldier's cap", "Turk's-cap", and "helmet flower".

The name "bear's-foot" probably applies to the leaves.

In the Rosaceae, we missed "albespine" an old name for the "white thorn" (*Crataegus coccinea*) which comes from *alba spina* which of course has the same meaning as white thorn *Crataegus oxycanthus* is the real hawthorn of Europe which is also called "quick" and "quick-set thorn" from its use in hedges. Other names for the hooked fruits of agrimony are "sticklewort" and "harvest-lice". It seems to be uncertain whether the mulberry was so called because its fruits resemble a blackberry, or the reverse. One thing is certain, the word mulberry is a very old term for the blackberry in England. The fruits of the blackberry were also anciently known as "branke-berries" and "bramble apples." The word "raspberry" appears to have been derived from a wine made of raspberry fruits which was called *raspis* in the 15th and 16th centuries.

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NOTE *and* COMMENT

Sunlight in High Latitudes.—At the north pole the plane of the equator coincides with the horizon plane so that on March 21st, or rather a few days earlier owing to the effect of refraction, the sun appears on the horizon and makes a complete circuit of the heavens in twenty four hours without setting. This brings to an end the long winter night of six months duration. From this time until the sun crosses the equator going south in September, it remains continually above the horizon for the observer at the north pole and gradually makes it way upward until it reaches an altitude of 23½ degrees at the beginning of summer in June. It then begins to gradually wend its way downward once more toward the horizon, disappearing beneath it at the beginning of fall for another six months. At latitudes between the north pole and the polar circle the sun appears above the horizon before the beginning of spring and rises and sets daily until it reaches a distance north of the equator equal to the observer's distance from the pole. It then makes a complete circuit of the heavens without setting, touching the horizon at the north point and the phenomenon of the midnight sun can be seen. The sun remains continually above the horizon from that day on, attaining a little higher altitude each day until the beginning of summer. After that its altitude above the horizon begins to decrease. When it has reached the same point as before on its southward journey it rises and sets daily once more until

it is as far south of the equator as the observer is from the north pole when it disappears completely from view below the horizon and the long winter night sets in to last until the sun has passed through the winter solstice and has again reached the same distance south of the equator on its return journey to the north.—*Science Service.*

Flowering Bamboos.—Readers of the *Botanist* who live in a winter sufficiently mild to permit the cultivation of bamboos in the open air will recall that it is a rare experience to find one in flower. Even in their native haunts many species flower only at long intervals, sometimes as much as thirty years, after which the whole plant dies; and it often happens that cultivated plants never produce any flowers at all. I had the unexpected pleasure this past season of coming upon a bamboo-hedge in full flower. The species, a very common one in cultivation here, introduced from Japan, is *Phyllostachys mitis*, belonging to a genus easily recognized by the fact that the internodes of the culm are flattened on one side. This species is perfectly hardy in our climate, but no flowers had ever been reported until a hedge in front of the State School for the Deaf suddenly in late August burst into bloom, the panicles in many cases being as much as two feet in length. This will doubtless end the career of that particular hedge; but the plant is easily propagated by root-cuttings. It would be interesting to know the experiences of other readers with flowering of this or any other species. Mrs. Agnes Chase tells me that though this *Phyllostachys* has been known in cultivation about Washington, D. C. for some fifteen years, it has never been known to flower.—*J. C. Nelson, Salem, Oregon.*

Plant or Animal Locusts?—Rev. George L. Tilton questions the statement, in a recent number, that the food of

John the Baptist in the wilderness was the fruit of the Carob tree. He writes: "If Matthew meant his readers to understand that John fed on carob pods I hardly think he would have written locusts; especially as certain species of locusts were a common article of food among the Bedawin Arabs and the very poor of the country generally. If you have not read the statement of Dr. Wm. Thompson forty years missionary in Syria, you may be interested in a quotation from his classic work, The Land and the Book, Vol. 2 pp. 107-8. "Do you suppose that the meat of John the Baptist was literally locusts and wild honey? Why not? By the Arabs they are eaten to this day. The perfectly trustworthy Burchhardt [who identified himself with the Arabs in his whole manner of living] thus speaks on this subject:—"All the Bedawins or Arabia are accustomed to eat locusts. I have seen at Tayf and Medina locust shops where these animals were sold by measure. The Arabs in preparing locusts as an article of food, throw them alive into boiling water with which a good deal of salt has been mixed. After a few minutes they are taken out and dried in the sun; the head, feet and wings are then torn off; the bodies are cleansed of the salt and perfectly dried, after which process whole sacks are filled with them by the Bedawin. They are sometimes eaten boiled in butter, and they often contribute materials for breakfast when spread over unleavened bread mixed with butter." Thus far Burckhardt. Then Dr. Thompson after stating that locusts were eaten only by the Bedawin and the very poorest people goes on to say, 'John the Baptist, however, was of this class either from necessity or election. He also dwelt in the desert where such food was and is still used, and therefore the text states the simple truth'. Were I trying merely to prove this point

I could easily add other authorities but I hardly suppose you seriously doubt it".

Puccoon and Marsh Elder.—Regarding the inquiry as to the significance of the word puccoon, Mrs. M. E. Soth writes: "I believe it is the Indian word for any plant from the root of which a reddish dye may be obtained as the *Lithospermum* and also the bloodroot; also the pigment itself. The books give "marsh elder" as the common name of *Iva xanthifolia* but I never heard it called that. We always called it "horse-weed" in Iowa because it was so lusty and abundant in places where horses were wont to be found. We youngsters called it "spear-weed" because its shining leafless trunks made such light, straight, shooting darts after frost shrivelled the leaves. It is interesting to note that it diminishes in size as it travels westward. In Colorado it is only half as high as eastward. Here in Idaho it is scarcely a yard high, a mere relic of its glorious condition in the East.

Woodless Lumber.—According to *Science Service* a board twelve feet wide and nine hundred feet long has recently been produced. This is a much larger board than could be produced from any tree that we know of. It is said to contain sufficient material to construct three five-room bungalows. This remarkable board was made from sugarcane, or rather from the refuse, of the cane after the sugar has been extracted. Sugar-cane refuse, known as bagasse, consists of the fibrous material of the plant and is very similar to the fiber from which paper is made. In making bagasse lumber the fiber is put through processes similar to those employed in making paper. The new lumber is said to be very light, waterproof and an excellent non-conductor of heat. Up to the present, refuse sugar cane has been of little use and is

usually burned to get rid of it. Now that a way to use it has been found, it is expected that the cane fields of Louisiana, alone, will yield over 750,000,000 feet of this lumber annually. There are many demands for wood that the new material will not supply, but it can be used in so many ways that it seems destined to take much of the pressure from our rapidly diminishing forests.

Ripening Grape-fruit.—Investigation proves that there are more differences in grape-fruits than are shown by size and color, though these latter, especially color, may indicate other differences when interpreted correctly. Everybody knows the difference that exists between green and ripe bananas. Green bananas are practically all starch but if left until the skins are yellow or nearly black these same fruits will become sweet and palatable. The fact is that bananas are alive and if given time will digest their starch and tannin into sugar. Not until this process is finished are the fruits actually ripe. Many people fail to realize that other fruits run though the same series of changes. In the case of the grape-fruit it has been found that when the fruits are held in cold storage for a period of from one to three months they develop a superior flavor. Much of the acid disappears and with it the bitter principle, while the sugar content increases. It is apparently another case of digestion improving the flavor. It has been supposed that the increase of flavor depends in some way upon cold storage, but this is probably incorrect. The length of the time the fruit is kept seems to be the important factor, for ones notices a remarkable difference in the flavor of grape-fruits that have not been in cold storage at all. In selecting these fruits, therefore, it is well to pay some attention to the color of the fruit and to select those which are fully ma-

ured and deep colored. Even slightly shrivelled fruits may prove desirable.

Chaulmoogra Oil.—A considerable stir has recently been made in the public prints regarding the virtures of chaulmoogra oil in the cure of leprosy. One might infer from this that the idea is new, but this proves not to be the case. As early as 1881, Dr. John D. Hill suggested this use of the oil in the "New York Medical Abstracts." The oil and its use is also mentioned in the "U. S. Dispensatory", edition of 1888.

Milkweed Traps.—The Asclepias' method of pollination does not seem very effective to me. In one umbel I counted ninety-four flowers each of which possessed two embryo pods yet rarely as many as five in the whole cluster develop. Does the plant need all of those fragrant blossoms to coax insects to help her make one or two grow into fruits? Nature is lavish again when she does make a pod for in one I counted two hundred and twenty-five seeds, each with its own pretty white sail. One June day I watched an ant struggling desperately on one of these blossoms. The middle and hind legs were all entrapped in the slits between the upstanding, enticingly sweet, hoods. The poor ant had no thought about the sweetness, being too busy trying to free itself. It would pull and twist and sometimes a leg would slip out but with the next movement it would slip in again. I wanted to help and held my middle finger for it to cling to. Then the middle legs came out and one of them bore a pair of yellow pollen-masses. A moment later the two other legs were freed. The insect was in a great hurry and it was difficult to keep it crawling on my hands and arms until I discovered pollen bags on one of the hind legs too. It seemed excited and bothered with the sticky appendages. I wished it could fly for it re-

minded me of a cat with its feet tied up in papers. Milkweed traps do not please me when I find three honey-bees hanging stiff and dead from the veritable death-traps which the blossoms sometimes become.—*Nell McMurray, Clearfield, Pa.*

KINGHEADS.—With regard to Prof. Nelson's inquiries about the names of *Ambrosia trifida* and *Iva xanthiifolia*. The name kinghead is in common use for the former in our region. I do not know any name in general use for the latter except that the inappropriate name marsh elder is much used. I have suggested for it the name false kinghead on account of its general resemblance to the other plant. A group of them around deserted homesteads truly does suggest a group of trees when seen at a distance.—*O. A. Stevens, Agricultural College, N. D.* Professor E. A. Bessey in a note to Prof. Nelson reports that *Iva* is known as "marsh elder" in the upper Peninsula of Michigan.

TWO NEW GARDEN PESTS.—It has often been questioned whether cotton or corn was king of agricultural products and the decision may have to be held in suspense for some time while we combat the enemies of both claimants to the throne. It is doubtless only another indication of the general decline of the king business that both crops are seriously threatened. Cotton is in danger from two kinds of boll-worms, both of which are steadily increasing in their invasion,while corn has the corn-ear worm and the cornstalk borer to contend with. The corn-ear worm has been spreading in the corn belt for many years. It is to all intents and purposes a cut-worm which eats its way into the growing ear of corn and defiles much that it does not consume. There are three broods in a season and more than enough of the repulsive worms to go around. Those that cannot find an ear of corn in which to

burrow attack tomatoes, peppers, beans, and other garden produce. The cornstalk borer is a more recent introduction. It comes from abroad and does great damage,not only to corn and broom-corn but to celery, beets, spinach, rhubarb, asters, cosmos, zinnia, hollyhock, gladiolus, dahlia and other plants. It was first noticed a few years ago in New Jersey but it failed to heed the quarantine regulations of our celebrated Federal Horticultural Board and has steadily spread westward. It has progressed as far as Ohio and it is now proposed to establish a new quarantine by prohibiting or restricting the movement of the plants mentioned above, across a line from Lake Michigan to the Ohio Valley. This may help some, but it ought to be clear to everybody by this time that a quarantine often does not quarantine. One lively entomologist in the field devising methods for controlling the pests is worth several reams of restrictions put out from Washington by the Government scientists.

EDITORIAL

A great many things depend upon the point of view. A cathedral may be seen through a keyhole or we may attempt to view it from a point so near that we see only the stones and mortar just beyond our noses. The idea is well illustrated in the matter of botanical nomenclature. The philosophical botanist views the rules for naming plants in their entirety and perceives that they are merely a means to an end and that end the distinguishing of one species from another; but the technical botanist is frequently too near his subject and fails to see it in proper perspective. He is fond of quarreling over different "codes" of nomenclature and he often uses up much good white paper in attempting to establish the priority of a favorite name which he has exhumed from some ancient and musty tome, or in trying to prove which of two dilapidated specimens is entitled to bear the name given by a botanist long since turned to dust. More reprehensible still is his worship of the author citiation. The philosopher realizes that the author of a plant name must frequently be cited to indicate the exact species meant, but the pettifogging botanist too often considers such citations as a means of gaining distinction for himself. He is frequently charged with changing names without sufficient reason when this will bring his own name into prominence. If this stricture is unjust, how else can we explain the fact that every albino flower and fruit and every variation from the normal in other plant parts is dignified by a name which includes the name of the author? To be sure all

important variations should have a name in order that they may be conveniently designated, but why the author citation? Does the namer of a white huckleberry or white cardinal flower fear we shall not know that it is white unless it is accompanied by the name of the eminent describer? In the older books this is not so, for nearly everybody realizes that albinos are likely to occur occasionally in any group of living things. The nonsense, moreover, does not stop here. It frequently happens at present, that if one author describes a specimen as a variety, another will at once call it a form or vice versa. This proceding enable the name-changer to make a "new combination" and thus inject his own unmusical patronymic into the citation. But who, it may be asked, can distinguish surely between a variety and a form? The lines that separate one specimen from another are not hard and fast. There are variations of all degrees of importance, seasonal, edaphic, geographical, physiological and what not, and nobody can really say where one ends and the other begins, unless it be the name-tinker standing too close to his cathedral. If we could only get him to stand a little farther back, what an immense number of trifling problems that now perplex his mentality would automatically disappear!

* * *

We have received notice that a third society for protecting the wildflowers has been organized. The newcomer appears under the joint auspices of the Massachusetts Horticultural Society and the Garden Club of America. That we can never have too many people interested in protecting the wildflowers is certain, but it may be questioned whether the results desired could not be better attained by uniting the efforts of all concerned into one strong movement. The great

criticism that can be made of most of the proposals for protecting plants thus far offered, is that they are based too largely on sentiment. Undoubtedly a very praiseworthy sentiment is at the bottom of all suggestions for protecting the flowers but it would seem that protection, itself, should be of more practical nature to be effective. We should at once locate all areas in which plants may be protected without conflicting with other uses of the ground—parks, cemeteries, large estates, woodlands, marshes, bogs, dunes, cliffs, river banks, lake shores, and railroad rights of way—and see that they are properly protected. And we are of the opinion that one stern sign to the effect that flower-gathers will be prosecuted is worth a hundred requests to "please do not pick the pretty flowers".

Perhaps the herb everlasting, the fragrant immortelle of our autumn fields has the most suggestive odor to me of all those that set me dreaming. I can hardly describe the strange thoughts and emotions that come to me as I inhale the aroma of its pale, dry, rustling flowers. A something it has a sepulchral spicery, as if it had been brought from the core of some great pyramid, where it has lain on the breast of a mummied Pharaoh. Some too, of immortality in the sad, faint sweetness lingering so long in its lifeless petals. Yet this does not tell me why it fills my eyes with tears and carries me in blissful thought to the banks of Asphodel that border the River of Life.—Oliver Wendell Holmes.

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DEATH CAMAS.—*Zygadenus venenosus*

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I would not say that trees at all
Were of our blood and race,
Yet, lingering where their shadows fall
I sometimes think I trace
A kinship, whose far reaching root
Grew when the world began,
And made them best of all things mute
To be the friends of man.

—Samuel Valentine Cole.

THE DEATH CAMAS

By Leslie L. Haskin

Zygadenus venenosus commonly known as death camas bears an evil reputation with reference to both man and beast on the Pacific Coast. Its danger to human beings comes from its resemblance to the true edible camas (*Quamasia*), of the same region. The Indians recognized its dangerous nature and used great caution to protect themselves from possible poison. To them it was an especial menace since it grows in the identical situations favored by the true camus, which was, and is, one of their principal food plants. Both grow in moist meadows and swales, often closely intermingled. Their bulbs, too, so nearly resemble each other that it is not safe to attempt to distinguish them when severed from the leaves and flower scapes.

It is true that the bulb of the *Zygadenus* never seems to attain to quite the size of a well developed *Quamasia* bulb but

as in every camas patch there are many small seedling bulbs, size alone is no safe criterion. As long as the fruiting capsules remain upon the plant, however, they are easy to distinguish. The capsules of the death camas are much smaller and more closely set upon the stem, and the scapes are more slender. The leaves, too, are narrower, and usually folded lengthwise, while those of the true camas remain flat. In spite of the Indian's knowledge of the dangers of the plant, cases of poisoning often fatal, seem not to have been uncommon among them. In Indian medicine, according to Chestnut, the bulbs are used as a poultice for boils, and for bruises and sprains, and are also applied as a cure for rheumatism.

Although the use of camas for food has never become general among the white inhabitants of this section, many people, as a novelty, enjoy digging and eating the bulbs in a raw state, and children are sometimes poisoned through failing to distinguish these from the bulbs of the death camas.

The bloom of the death camas is very attractive, being white with each section of the perianth bearing a yellow gland at the base. The many-flowered scapes rise to a height of from six inches to two feet, much exceeding the narrow inconspicuous leaves. In the Willamette Valley the blossoms appear about the middle of June, and are rather short lived.

Horses and cattle are sometimes made sick from eating death camas, but seldom with fatal results. By far the greatest loss from this plant occurs among bands of sheep. According to Mr. Lawrence, of the Oregon Agricultural College, the fatalities to sheep sometimes reach as high as "twenty-one per cent in a band" in regions where the plant is common. In the same connection he states that all parts of the plant are dangerous, but are "poisonous in the following order, beginning with the most toxic: seeds, mature pods, flowers,

leaves, bulbs, roots, young pods." Hogs seem not to be affected by the poison of this plant. On the other hand they appear to relish it, which has given it among other common names that of hog's potato. Other names locally applied to the plant are lobelia, poison grass, poison sego, alkali grass, water lily, wild onion, and soap root.

FLOWERING PLANTS IN MASSES

By R. M. Crocket

IT is most interesting to note, as one journeys through the country, how lavishly flowering plants that are either small or not particularly striking in the individual are massed so as to present a bold effect. In a pasture between Hartford and Manchester, Connecticut, there appears with the first breath of spring, a wonderful display of pearly whiteness that might seem to be snow or hoar frost to the tired commuter as he whizzes by on the trolley. Closer examination, however, discloses the fact that the effect is produced by the unassuming pussy-toes (*Antennaria dioica*) with its fuzzy little edelweiss like flower-heads three or four inches above its tufts of woolly leaves.

Following this initial display, in the same pasture, with hardly an interval between comes a vision of the daintiest loveliness in lilac-lavender shades. Our friends the bluets (*Houstonia coerulea*) are blooming. Day after day they persistently present fresh faces to the sky and *en masse* maintain an apparently unchanging sheet of blue. A careless cow may obliterate with its hoof a score of the delicate things yet, until the grass around them has grown tall enough to obscure their beauty, the picture at a distance is perfect.

After the bluets are hidden by the grass and other plants,

Strangely enough the true mountain mint, to judge from the significance of its generic name, *Origanum,* seems never to be called by that title. The best known species, *O. vulgare* is known as "wild marjoram" and "pot marjoram," both terms derived from *majorana* by which name a European species has been called for more than a thousand years. "Organy" and "organs" are easily seen to be contractions of *Origanum* while "winter sweet" refers to its odor.

There are a number of "false pennyroyals" among the Labiates. One of these is *Isanthus brachiatus* and another is *Trichostema dichotomum.* The latter is more commonly called "blue curls". An allied species, *T. lanceolatum* shares the name of "false pennyroyal" and is also known as "flea weed", both names carried over from the true pennyroyal. This latter species is also "vinegar-weed", "camphor-weed" and "turpentine," names which, we infer, have reference to the odor, but this is only a conjecture.

First among medicinal labiates should come the garden sage (*Salvia officinalis*) if names count for anything, for from the generic name is derived the common name "sage" and to it are related such words as solid, safe, solemn, and salvation. *Salvia lyrata* is the "cancer-weed" though utterly belying any reputation for curative properties. Another species, *Salvia sclarea,* is called "clary", "clear-eye" and "see-bright" because its mucilaginous seeds were used to clear the eyes of foreign matters as we now use the seeds of flax. *Salvia verbenacea* is also "wild clary" and "eye-seed." The "wood sages" are species of *Teucrium.* Our commonest species, *Teucrium Canadense,* is commonly known as "germander". This name the authorities would have us believe, is derived from the specific name of the European germander, *Teucrium chamaedrys.* It may seem incredible that the common tongue could

have made "germander" from *chamaedrys* but stranger mistakes than this have been made by the unlettered. *Teucrium scorodonia* is the "germander sage". A species of another genus, *Phlomis tuberosa*, is the "Jerusalem sage" and "sage-leaf mullein," the latter name given in reference to its woolly leaves.

Second only to sage, or possibly before it, as a healing herb is *Prunella vulgaris*. The genus is named from the German *braune* a disease of the throat (quinsy) for which it was once regarded as specific. Its reputed curative powers were even of wider application for the plant is also known as "heal all', "self heal", and "all heal". It was regarded as especially good for cuts as we find hinted at in "Sicklewort", "hook heal", "hook weed", and "carpenter's herb." "Square stem" is a name which must have been given to the plant by someone who failed to observe that most mint stems are square. "Carpenter's square" has no reference to that artizan's best known implement but is another reference to the shape of the stem. "Brown wort" (from *braune*), of course refers to its use in the cure of quinsy. "Heart-of-the-earth," sometimes applied to this plant, is said to be given it because it uses up the soil, but to me it seems more likely that it alludes to the plant's many virtues, whose excellence these more degenerate modern days utterly fail to substantiate. "Blue curls" refers to the flowers and is probably the commonest common name of the plant at present in spite of the fact that *Trichostemma* also bears it. "Blue Lucy" is another name refering to the color of the flowers. "Dragon head" appears to be a fanciful name and "thimble flower" a meaningless one, though by a great stretch of the imagination one might fancy the spike of seed pods to resemble a thimble.

Still another group of reputed vulnerary plants are the

species of *Stachys*. The most familiar is *Stachys palustris* which is known as "all-heal", "clown's-heal", "clown's woundwort", and "marsh woundwort". The name "rough-weed" refers to the foliage while "hedge-nettle" is probably inspired by a fancied likeness to the real nettle, though another name "dead nettle" indicates that the difference is perceived. *Stachys hyssopifolia* is the "hyssop hedge nettle". *Stachys arvensis* is the "corn woundwort", or "field woundwort" from its habit of growing in cultivated areas.

There are still other dead nettles among which may be noted the "hemp dead nettle" (*Galeopsis tetrahit*). This plant is also known as "bee nettle", "dog nettle", "blind nettle", "flowering nettle", "nettle hemp", and "false hemp". Nearly all of these terms illustrate the tendency of the common people to group plants of similiar appearance together. The adjectives false, dead, and blind, however, show very clearly that they have not been deceived by appearances but have distinguished the plants to which they are applied from the true stinging nettles (*Urtica*) and other less harmful kinds. "Flowering nettle" is a pardonable mistake, for the flowers of the true nettles have little resemblance to what are ordinarily regarded as flowers. The definition of such terms as flower and weed of course depends somewhat upon who is doing the describing. *Galeopsis ladanum* is the "red hemp nettle" and "dog nettle". This and the preceding species are also known as "ironwort", for what reason I do not know.

The list of dead nettles is not complete without three species belonging to the genus *Lamium*. Upon *Lamium album* have been piled "white dead nettle", "dog nettle", "blind nettle", "dumb nettle", and "bee nettle", besides "snake flower", "suck-bottle" and "white archangel". It is very apparent that a nettle that cannot sting is in common parlance, either

false, deaf, dumb, blind or dead. The term "archangel" applied to this plant has been given to several others in reference to their size or beneficial qualities. The true "archangel", at least on the authority of the scientific name, is *Archangelica* a genus of Umbellifers allied to the carrot and celery. The species of this genus have an aromatic odor and it is possible that our plants may have been named with reference to this quality; certainly they are quite unlike it in appearance. *Lamium amplexicaule* has been named the "henbit" or "henbit dead nettle". "Henbit", according to the dictionary is a morsel for hens but how it applies to this species is a mystery. *Lamium purpureum* is the "red dead nettle", and "sweet archangel". Old names for it are " dog nettle", "French nettle" and "deaf nettle." The name "rabbit meat" doubtless refers to the idea that rabbits eat the plant.

The list of plants called mints has not been used up with the species already mentioned. There is still the "stone-mint" or "sweet horse-mint", by which our only species of *Cunila* is known. Its more familiar title is "dittany" which is itself said to be derived from *Dictamnus* the name of a European plant so named because it was abundant upon Mt. Dicte in Crete. The true "dittany" is regarded as being *Dictamnus fraxinella.* Our plant is another of the "basils". Still other mints are the "wood mint", by which name *Blephilia hirsuta* is known and "Ohio horsemint", the common name of an allied species, *B. ciliata.* Nor have we yet listed the familiar "catmint" (*Nepeta cataria*) beloved of cats, and whose leaves are made a soothing tea for babies and irritable adults. It is also known as "catnep" or "catnip" the latter title being the more familiar. From the fondness of cats for it, the plant was known as "cat's heal-all". *Agastache nepetoides,* which, as the specific name indicates, resembles the better known

plant is also called "catnip" but it is better known as "giant hyssop".

The peculiarly appropiate name of "obedient plant" is applied to *Physostegia Virginiana*, a tall plant with showy magenta flowers borne in terminal spikes. The individual flower-stalks are so constructed that when a blossom is pushed to the right or left it will retain the position until pushed in another direction thus accounting for the name. "American heather" is an attractive book name that might well have a wider circulation. The clustered flowers are not so very unlike those of the true heather (*Erica*). "False dragon-head" and "lion's heart" given this plant are general names that more properly belong to the species of *Dracocephalum* among which our species is sometimes included. *Dracocephalum parviflorum* is the plant most commonly regarded as the true "dragon-head" or "lion heart". Both names appear to be mere fanciful appellations, though "dragon head" is a literal translation of the generic name which was given for some supposed resemblance of the flowers to a dragon.

The name of "lion's tail" belongs to another mint, *Leonurus cardiaca* which is more commonly known as "motherwort" from its reputed value in cough mixtures. It is also known as "lion's ears" but those who call it so have directed attention to the wrong end of the animal. The generic name is surely translated "lion's tail". The specific name, *cardiaca*, however, has reference to the heart and we might hastily conclude this to be the true lion's heart, if it were not practically certain that the specific name is connected with the plant's reputed power as a heart tonic. "Cowthwort" is a meaningless old English name. *Leonurus marrubiastrum* is the "horehound motherwort", but the true "horehound", which this resembles, is *Marrubium vulgare*. The latter plant is also

known as "white horehound", "hound's bane", "marrube" and "marvel". The word "horehound" is said to be derived from *hoar*, white, and *hune*, plant, and to have no reference to dogs. It should therefore be spelled hoarhound, but the modern way of spelling it is the one I have used. *Ballota nigra* is the "black horehound", "fetid horehound", "hair hound", "false horehound", "black angelica" and "henbit". All are intelligible and the last two indicate a mental association of these plants with *Lamium*. Another plant often wrongly named "horehound" is *Lycopus Europaeus* which is usually better known as "water horehound" or "marsh horehound". This is also the "green archangel" and "gypsy plant" or "gypsy weed". The last two names allude to the belief that this plant is used by gypsies to stain the skin. *Lycopus rubellus* and *L. Americanum* are other species that are known as "water horehound" and "gypsy wort", and the latter shares the name of "bitter bugle" with *L. Europaeus*. *Lycopus Virginicus* is known as "bugle weed", "bugle wort" or "wood betony". The last name results from a confusion of this species with the real wood betony (*Betonica*). The species of *Ajuga* are also commonly known as "bugle weeds", from a fancied resemblance to the well known musical instrument. "Bugle", it may be said, is derived from *buculus* a diminutive of *bos*, an ox, and the reference is of course to the horns. *Ajuga reptans* is the species most commonly called "bugle-weed" or simply "bugle". It is occasionly known as "carpenter's herb" and "sickle wort", names which are apparently due to the confusion of this species with *Prunella*.

The species of *Scutellaria* are generally called "skullcaps" from the appearance of the fruiting calyx like a helmet with visor closed. *Scutellaria lateriflora* is the "mad-dog skull cap" and "madweed" because it was once reputed to be

a cure for rabies. "Hood-wort" is another reference to the calyx and "blue skull-cap" and "blue pimpernel" refer to the color of the flowers though the pimpernel is a very different plant. *Scutellaria galericulata* is the "marsh skull-cap" and "hooded willow-herb". It may be added that its form does not in the least resemble either the willow or the willow-herb.

In rich woods in early summer, one may find the broad leaves of *Collinsonia Canadensis* surmounted by its panicle of yellowish lemon-scented, flowers. The knotty root, or rather rootstock, is a marvel of hardness and gives the plant such names as "knot-root", "knot-grass", "knob-weed", and "stone-root". "Horse-balm" and "ox-balm" allude to its superior size and "citronella" to its scented flowers. The name of "richweed" and "rich leaf" probably refer to its place of growth.

Early in spring one often finds the earth in waste places covered with a tangle of roundish leaves through which peep great numbers of cheerful though small, blue flowers. This is *Glechoma hederacea* a lowly relative of the catnip and commonly called "ground-ivy" as the specific name suggests. It is abundant on both sides of the Atlantic and has a host of common names most of which are of obvious significance as "gill-over-the-ground", "gill-go-by-the-ground", "gill-run-over", "creeping Charley", "creeping Jenny", "wild snake-root" and "robin-runaway." The terms "ale-hoof", "tun-hoof", "hay-hoof" and "hove" may have been derived, as often suggested, from the Anglo-Saxon *hufa*, a crown, because garlands for country inns were made of it, but there is also a possibility that the name was originally "hai-hove" meaning "hedge-ivy" since still other names for it are "hedge-maids" and "hay-maids". "Ale-hoof" may also be a corruption of ale *heave* and refer to the use of this plant in making the ale "heave" or

"work". Darlington, in his "American Weeds and Useful Plants" says that this species was used as late as the time of Henry VIII of England to clarify and flavor the ale. An infusion of the plant with ale was known as "ale-gill". Such are some of the perplexities that confront the investigator when he attempts to unravel the meanings in the vernacular names of plants.

SELECTING SUPERIOR VARIETIES

By F. W. VonOven

OUR knowledge of the great outdoors, Nature's arboretum, is not complete until the botanist can tell us of all the kinds and varieties and where to find them. To ascertain the members of the indigenous flora of any community is quite a problem in itself and the reporting of such matters is a practical scientific outlet for those botanists who scour their territories from year to year. In these journeys they are bound to notice special trees or other plants noteworthy for their foliage, color, shape, vigor, age or size.

Hawthorn trees and their hybrids may be investigated as to the ornamental value of their foliage or shape, the earliness of their flowers or fruits, size of fruits, single and doubleness of flowers, and other features which determine the superiority of one tree over another. The planting of a thousand acorns or a thousand seeds of elms will never bring a similar number of trees with the vigor, foliage, shape, and other characters of the parent species. There is great variation in the seedlings and only the best should be selected.

Botanists should not only know the names of the typical indigenous trees and shrubs but should be informed as to the location of such superior types as occur. A nurseryman or horticulturist naturally becomes more or less a botanist through close inspection of the varieties which he has under observation in his plant collections from year to year and thus numerous desirable varieties are originated. The Hollanders and other foreign plant growers selecting the stronger strains of plants from their seedlings have thus turned out many of the fine varieties that are the basis of our horticulture today.

Has it ever come to your mind that there are many beautiful perennial plants growing wild in our country that if put under cultivation would themselves be of value and if hybridized might become the parents of other worthy garden varieties? Have you ever reflected that only the most hardy and vigorous plants of a species or variety should be the basis of propagation? Why then, waste hundreds of years of effort by planting the inferior varieties? Those who can assist in locating the specimen trees, shrubs and other plants from which seed or propagating stock may be had would be doing a great favor for horticulture by reporting them. It may take several years of comparison in a given locality to determine the value of some varieties which seem to have superior qualifications, but you will be doing a good work for horticulture and possibly you may find some varieties that have not as yet been named.

BOTANY FOR BEGINNERS—VI

By Willard N. Clute

IT is probably a fortunate thing, considering man's ideas of beauty, that Nature did not make all plants alike. No doubt a world might have been created with nothing on it but grass, or ferns, or pines from pole to pole, but we have been spared such monotony. On our better ordered planet, there are not far from one hundred and twenty-five thousand flowering plants, to say nothing of nearly as many mushrooms, ferns, puffballs, mosses, seaweeds, and similar plants that never produce either flowers or seeds. To be sure the existence of such names as rose moss, flowering fern, asparagus fern and sea lettuce seem to indicate that these latter plants may flower on occasion, but in every case the names are founded on a misapprehension.

If we ask ourselves why there should be nearly two hundred and fifty thousand kinds of plants in the world, the most satisfying answer is, that since there are mountains and deserts and plains, swamps and bogs and ponds, lowlands and elevated regions, temperate, torrid, and frigid zones, and many combinations of these, vegetation has had to adopt a great variety of forms in order to fit into the different situations presented.

There are, of course, a large number of people who still hold to the opinion that plants have existed in the forms they now exhibit, since the very beginning, but it seems more reasonable to suppose that during the millions of years that

plants have inhabited this unstable and changing earth, a certain amount of change must have occurred in them also. Everybody must be aware that no two objects in nature are exactly alike. There is indeed, more or less variations in plants of the same kind and the plant breeder has taken advantage of this to produce a long line of improved varieties of garden vegetables, flowers and fruits.

Left to themselves, plants must have worked out some similar methods of improvements, for given the power, which all flowering plants possess, of producing seeds far in excess of the number necessary to replace those annually lost by death, there is certain to be an over-production of young plants and consequently great competition for every square foot of available space. Only those plants whose natural variations give them some advantage over the others could possibly hold their own under such circumstances. The less nicely adjusted to the locality would naturally perish and leave no sign. In fact we may see this very struggle going on in our own gardens and waste lands every growing season. Millions of young plants spring up, only to be ruthlessly smothered out in their infancy by a few stronger and thriftier individuals who have the ability to take and the power to hold. Thus does Nature play into the hands of the more efficient individuals.

Considering these facts, one perceives that the resemblances he notices among plants are not mere accidents. Here, as elsewhere among living things, resemblance denoted relationship. The different forms have descended from a common ancestor and those which most closely resemble one another are most closely related. As in human families, plant children resemble their parents, first cousins may have many family traits in common and these traits somewhat dimmed by distance may appear in second cousins and others more re-

motely related. Such resemblances, indeed, are recognized by the non-botanical. Give a man an unfamiliar plant and he at once attempts to classify it. He says "It looks like a lily," "like a rose", or "like a grass" as the case may be. The botanist with more knowledge upon which to base his conclusions is more certain of the relationship and uses this information to arrange the plants of the world in related groups. All the plants of one kind he groups as a *species*. It is not hard to recognize the members of a species for the essential thing about them is that they are practically alike. Nor is it much more difficult to recognize closely related species because of their general family resemblance. For instance, the red clover, the white clover, and the crimson clover would be recognized at sight as members of the clover group. To a group of closely related species of this kind, the botanist gives the name of *genus*. In this way the scientific names of plants originate. They are simply the names of the genus and species to which a given plant belongs.

There are, of course, cases in which the family likeness is not at all conspicuous and then even the botanist may be puzzled. Plants of this kind are joys to the name-tinkers who are wont to debate with much gravity whether some slight difference in form is sufficient to warrant the setting up of a new species. It may be said that those who are constantly engaged in hairsplitting studies may perceive differences not apparent to the casual observer, just as when one goes into a foreign country, the people at first look pretty much alike but eventually their individual peculiarities appear. In consequence, the herbarium student often makes species that the field botanist distinguished with difficulty if at all. It used to be said in Washington, when the craze for making violet species was at its height, that before a violet could be properly identified,

one must not only know when and where it was collected, but who collected it!

When species closely resemble one another, it requires, of course, very nice distinctions to determine their position in the plant world. One then realizes the truth of the dictum that "species are but judgments" and can appreciate some of the difficulties of the strict scientist. A fertile subject for discussion is whether similar plants of the Old World and the New belong to the same species. In the northern part of both Hemispheres, there are numerous plants that appear to be identical but that are not always called so, and the difficulty of judging them properly is increased by the fact that the material used for comparison is usually in a dried condition. One who has worked in an herbarium knows that the closet botanist may become so accustomed to dried plants as to fail to recognize their living representatives. It is said that when an eminent New England botanist found it hard to name a plant fresh from the field, he used to say to his followers "Let us dry it and then see how it looks!"

But unless one is making a dead set at nomenclature and taxonomy, the vagaries of the technical botanist need give him no concern. The fields and woods are full of flowers that are quite recognizable and easily named. To find them year after year, springing from the selfsame nooks and punctual to their time of blooming, almost to a day, is a pleasure that the strict scientist, engaged with dry facts, often misses entirely, but one that is never denied children, poets, and all good botanizers.

IMPORTANT MOVEMENTS OF PLANTS III

By John J. Birch

GEOTROPISM AND APOGEOTROPISM.

Geotropism is the downward movement of sub-aerial organs. All roots penetrating the ground are guided in their downward course by this factor. The manner in which it acts seems quite clearly understood. Gravitation draws the heavier content of the cells, especially the starch grains, to the the bottom of the cell. Here their accumulated weight presses on the sensitive protoplasm and produces a condition of strain, differing from anything in the upper part of the cell, and it is this difference which establishes the line of direction. When the responding mechanism is so set main roots are sent growing towards this pressure, main stems away from it and side parts across it, precisely as in other typical responses. Geotropism is a perfect example of the fact that a stimulus acts merely as a guide and not as a physcial aid to responses. Gravitation might be supposed to help pull roots downward, but it cannot be imagined to push stems upward or to drive side parts crossways.

The geotropism of leaves is disguised by their stronger heliotropism; but that they are geotropic is shown by the positions they assume when kept in dark rooms. Flowers are also exceedingly geotropic. If a long terminal cluster of larkspur be bent over and fastened in that position, each blossom as it opens will turn over individually to the identical position, it would have occupied in the vertical cluster. The position of each separate flower is established geotropically

Of all the stimuli made use of by plants for advantageous guiding of their parts, gravitation is by far the most important. Plants have in themselves an hereditary tendency to put forth their parts in a symmetrical manner, but they depend upon geotropism to guide those parts to the suitable positions and thus realize the ultimate shape of the plant. This is applicable not only to the main structures, but to most of the minor parts being the case especially with roots. The fact that geotropism is thus ever tending to hold the plant in a certain upright symmetrical form explains why any one-sided turning in response to other stimuli is of a limited amount, and why the plant always tends to recover its former upright and symmetrical position in case it is disturbed.

Apogeotropism is the reverse of geotropism. Different species and different parts of the same species are acted on by apogeotropism in very different degrees. Young seedlings, most of which circumnutate quickly and largely bend upwards and become vertical in much less time than do other plants, but whether this be due to their greater sensitiveness to geotropism, or merely to their greater flexibility is not definitely known.

A part or organ which is extremely sensitive to geotropism ceases to be so as it grows old and it is remarkable as showing the independence of this sensitiveness and of the circumnutating movement, that the latter sometimes continue for a time after all power of bending by gravity has been lost. Also geotropism acts when very nearly balanced by an opposing force. When the stem of any plant bends during the day towards a lateral light, the movement is opposed to apogeotropism, but as the light gradually wanes in the evening the latter power slowly becomes more powerful and draws the stem back into a vertical position. A stem or other organ

which bends upward through apogeotropism exerts considerable force, such as that of its own weight, which has to be lifted. This is often sufficient to cause the part to bend downward; but the downward course is rendered more oblique by the simultaneous circumnutating movement.

HYDROTROPISM

There is in roots an inherent tendency to move towards a direction where moisture is most plentiful. The advantage of hydrotropism is perfectly evident, for it is the very first function of roots to absorb water. It is believed that water is absorbed more rapidly on the side of its greatest abundance. It undoubtedly causes an osmotic swelling and tension, stronger on that side than on the other, and this difference is ample to establish a line of direction towards which roots turn in their growth. Stems and leaves are obviously not hydrotropic for they do not absorb any water. This fact illustrates the adaptive character of responses; for it is a general rule that plant parts are indifferent to stimuli to which there is no advantage in responding.

It is said that when trees develop in a uniformly moist soil, the root tips tend to collect in a circle just under the outer drip of the foliage, which is obviously the place of greatest dampness. But in case the soil is moister on one side than another, the roots grow more freely in that direction, and the distance to which they will grow is sometimes almost incredible.

CHEMOTROPISM

Chemotropism is the sensitiveness of certain plant organs by virtue of which they change their directions of growth when acted upon by chemical substances. Roots will turn towards a source of supply of some of the minerals they absorb. The pollen tubes in their growth, turn towards the substances

secreted by the stigmas and styles. If the organ bends so as to grow towards the source of the substance it is positively chemotropic to that substance; and if it turns away it is negatively chemotropic. In elongated organs, such as roots, the movement is a matter of growth. The curvature is brought about by the retardation on one side or the acceleration on the other; or by both together. The side on which the retardation occurs becomes concave, while the other is convex. If a root is positively chemotropic towards a substance, the side coming in contact with most of the substance, will be retarded in growth and become concave, as the substance diffuses thru the medium in which the root is growing. If the root is negatively chemotropic, acceleration of growth takes place with an accompanying convexion of the root. Thus the root tip is turned either toward or away from the source of the diffusing substance and the bending continues until all sides are equally stimulated.

MINOR TROPISMS

There are other movements in plants which, although of equal importance with the aforementioned are generally considered modifications thereof.

Aerotropism is a term applied to the power of responding to gases, particulary oxygen, in the same way as chemotropism. Illustration of this is found in water plants having floating leaves. The length of the petioles is altered in accordance with the depth of the water. The petioles continue to grow until the leaves reach a supply of free oxygen, when they stop. This case illustrates the fact that stimuli serve as signals to stop a process as well as to guide it and such are undoubtedly very important in controlling the various processes of growth.

Electrotropism is a certain adjustment which a plant will make to a mild electric current. Thermotropism is the turning of the roots towards warmth. It is very rare and possibly has been confused with other stimuli. Rheotropism is the turning against a water current. This illlustrates a confusion of stimuli, for undoubtedly the roots mistake the pressure of the flowing water for a hard object in the soil and attempt to turn away therefrom. There are others which might be mentioned, but they are of lesser importance.

NYCTITROPIC MOVEMENTS

These are commonly called "sleep movements" in plants and are brought about following variations in the intensity of illumination, so that parts have a diurnal and nocturnal position. The sleep of leaves is a phenomenon so conspicous that it is observed as early as the time of Pliny. Since Linnaeus, the scientist of antiquity published his essay, "Somnus Plantarum" it has been the subject of many investigations.

The movements which result from circumnutation, are modified and regulated by the alternations of day and night or light and darkness; but they are to a certain extent inherited. Leaves when they go to sleep move either upwards or downwards, or in the case of leaflets of compound leaves, forwards or backwards,—that is, towards the apex or the base. In almost every instance the plane of the blade is so placed as to stand vertically or nearly so at night. The upper surface of each leaf and more especially of each leaflet, is often brought into close contact with that of the opposite one. This is sometimes effected by singularly complicated movements. This fact seems to suggest that the upper surface requires more protection than the lower. There are plants in which the terminal leaflets after turning up at night so as to stand vertically often continue to bend over until the upper surface

is directed downward, while the lower surface is fully exposed to the sky, and an arched roof thus formed over the two lateral leaflets which have their upper surfaces pressed closely together. Here there is an unusual case where one of the leaflets does not stand vertically at night. The position which leaves occupy at night indicates with sufficient clearness, that the benefit derived is the protection of their upper surfaces from radiation into the open sky and in many cases the mutual protection of all parts from cold, by their being brought into closer approximation.

The nyctitropic movements of leaves are easily affected by conditions to which plants have been subjected. If the soil be too dry, or if the humidity be very low, the movements are much delayed, or fail altogether. Some have advocated the idea that the quantity of water absorbed has a great influence on the movement of leaves and that the variable amount of shrinking of leaves bears a relation to the amount of water in the plant. It is the accepted belief however, that the nyctitropic movements of leaves, leaflets and petioles are effected in two different ways: first, by the alternately increased growth on their opposite sides, preceded by increased turgescence of the cells, and second by means of a pulvinus or aggregation of small cells generally destitute of chlorophyl, which also become alternately turgescent on nearly opposite sides. When pulvini are present, the nyctitropic movements are continued for a very much longer period than when such do not exist.

The sleep of cotyledons is as pronounced as the sleep of leaves. As a general observation, cotyledons provided with pulvini continue to rise or sink at night during a much longer period than those destitute of this organ. In this latter case the movement no doubt depends on alternately greater

growth on the upper and lower sides of the petioles or of the blade or of both, preceded probably by the increased turgescence of the growing cells.

There is an independence of the nocturnal movements of the leaves and cotyledons on the same plant, and on plants belonging to the same genus. This leads to the belief that the cotyledons have acquired their power of movement for some special purpose. Other facts lead to this same conclusion, such as the presence of pulvini, by the aid of which nocturnal movements are continued during some weeks.

The cotyledons of some species move vertically upwards and others vertically downward at night; while in others one cotyledon moves upwards while another moves downward. Biologists are justified however, in assuming that the movements have been acquired at least in most cases, for some special purpose; nor can we doubt that this purpose is the protection of the upper surface of the blade and perhaps of the central bud from radiation at night. All gardeners know that plants suffer from radiation. It is this and not the cold winds that the peasants of Southern Europe fear for their olives. It is a known fact that a thermometer rises as soon as a fleecy cloud, high in the sky, passes over the zenith. Seedlings are often protected from radiation by a very thin covering of straw, and fruit trees on walls by means of a few fir branches, or even a thin netting spread over them. Fruit growers place smudge pots in their orchards in order to protect the buds.

Many flowers close at night, and these are likewise said to sleep. Their movement is effected by the same mechanism as in the case of young leaves; namely unequal growths on opposite sides, yet they differ essentially in being excited chiefly by changes in temperature instead of light. Very likely they close at times when the pollen is liable to become destroyed,

and thus their movement seems to be one of self preservation.

The analogy between animal and vegetable life is further demonstrated by the well known fact that while some creatures such as the owl and cat, sleep during the day, and remain awake at night, certain plants do the same thing. There are plants which close at nine o'clock in the morning and open at evening time. Every hour of the day has some particular plant which shuts itself up, hence the idea of the flower dial by means of which the hour of the day can be told with a remarkable accuracy. Some plants shut themselves up in the daytime and flower at night. It is said that Linnaeus used to go out in his garden at night with a latern to have the opportunity of witnessing this remarkable peculiarity in the plants in which it is exhibted.

THE RESULT OF DEVELOPMENTS

Thus one may see that the movements of plants are very complex. A casual observation leads one to assume that their movements are very primary and seemingly of little importance to the organism, but upon more complete observations the reverse of this is found to be true. Their movements are extremely intricate and regular, having a direct bearing on the well-being of the plant. It is probable that we have by no means observed all the movements and undoubtedly as the field of biology enlarges and becomes more and more closely related to plant psychology, new movements will be found to exist and the old movements shown to have greater bearing on the life of the plant.

The responses to a stimulus, while it may be highly efficient to the plant, is blindly invariable and not alterable for particular conditions. There is no sign of an attempt to correlate stimuli and respond in a manner which would be best for any particular combination. In this respect, animals have

advanced much further than plants for they have acquired the power of correlation and here is the chief feature which designates the higher animals from the higher plants. Thus out of one and the same origin, plants have developed irritability, which is the response to stimuli, while animals have reflex actions, consciousness and ultimate reason, which is mind.

Pollen Peculiarities.—In the course of an article on "Pollen Enzymes" in the *American Journal of Botany*, Julia Bayles Paton mentions various interesting things about pollen grains that may not be known to the general public. A medium-sized plant of maize is reported to produce about fifty million pollen grains and cat-tails (*Typha latifolia* and *T. angustifolia*), which often have sixty thousand flowers in a single spike, produce enormous quantities. Another member of the cat-tail family, the elephant grass (*T. elephantina*), of the East Indies and New Zealand yields so much pollen that the natives use it for making bread and cake. A gram of ragweed pollen has been estimated to contain one hundred and seventy-two million grains. Pollen grains are said to be very resistent to heat, cold and dryness and certain kinds have been known to retain their vitality for many years. Pollen of the date palm was found by Popenoe to be usable after seven years. In color, pollen varies from white to yellow or dark red. In *Lythrum salicaria* there are two sets of stamens each with its own color of pollen.

NOTE *and* COMMENT

Twenty-eight Million Fern Leaves.—Nearly thirty million fern leaves sounds like a large number, but this is the number which *Horticulture* reports to have been shipped from Bennington, Vermont, in a single year. To secure these leaves, nearly a hundred thousand dollars were paid out in wages. Such facts as these give some indication of the proportions to which the business of collecting fern leaves, principally leaves of the spinulose wood fern, for the florist has grown. Whenever the florist receives an order for cut flowers, it is his custom to add a bit of greenery in the shape of fern leaves. Many people suppose that the ferns are grown for the purpose as the flowers are, but this incorrect. All are obtained from wild plants. It is still a question whether pulling off the leaves of ferns in midsummer or later will ultimately destroy the plant, but the species in greatest demand is distributed over such an extensive area that it will be many years before the wild supply is exhausted. At present, in Vermont, an insect, by eating the tender tips of the fronds has joined man in destroying the plants.

Japan Quince.—Supplementing what has been said recently in these pages regarding the fruiting of the Japan or flowering quince (*Cydonia Japonica*), it may be noted that this year, in various parts of northern Illinois, this shrub has fruited more abundantly than has ever been recorded before. In many cases the bushes are bending down with their weight of fruit. What has caused this sudden fruiting is not evident unless the flowering period has happened to coincide with a

season particularly favorable for pollination. Ordinarily the habits of this plant have justified the name of *flowering* quince. The plants seldom fail to produce a good crop of flowers, but the fruits are usually so rare that few people have seen them. The writer of these lines has seen the fruit but twice before. The ripe fruits are not greenish-yellow as Bailey's "Cyclopedia" has it, but are clear dandelion-yellow. They average less than half the size of the garden quinces, though many are of fair size.

Owners of Complete Sets.—When we published the list of owners of complete sets of this journal in the last issue, we were aware that two sets had been purchased by F. W. VonOven, president of the Naperville Nurseries, Naperville, Ill., but we did not know that one set had been presented by Mr. VonOven to the Morton Arboretum, of Chicago. The Arboretum, itself was a present to Chicago from Mr. Joy Morton the son of Hon. J. Sterling Morton who originated Arbor Day. Set number 64, therefore, is located at the Morton Arboretum, Lisle, Ill. It is interesting to note in this connection that Illinois holds the record for complete sets. Nine are owned in the State. Massachusetts, New York and Ohio have six each, Pennsylvania has five, Iowa three, and New Hampshire, Connecticut, Indiana, Missouri, Texas, and Colorado have two each. Twelve other States have one set each and three sets are in foreign countries.

Pasture Plants.—We are accustomed to the fact that cows do not eat *Asclepias* and *Ranunculus*; at least our common milkweed and creeping buttercup are left undisturbed when everything green in the vicinity is appropriated. It is interesting to walk into a field where cattle have recently been turned loose and note their fondness for the wild sarsaparilla (*Aralia nudicaulis*). This plant is apparently the first to be

consumed. In a large patch, nothing was left but the balls of greenish florets. Sarsaparilla has the habit of concealing its flowers the same as mandrake. Looking down upon a colony of plants one sees only a dense mass of leaves. Each leaf has three compound divisions on a long petiole. About half as tall, and close beside it, stands the flowering stalk with three or four peduncled umbels at its summit.—*Nell McMurray, Clearfield, Penna.*

Oldest American Botanical Gardens.—When the subject of the oldest botanical gardens comes up, one's mind is likely to turn to Bartram's garden in Philadelphia, Prince's garden on Long Island, or the Elgin garden in New York. These were all established in the early days of our country, but have long been abandoned as botanical gardens, though Bartram's garden still exists. The botanical gardens that at present are entitled to the name are of comparatively recent origin. The Missouri Botanical Garden is probably one of the oldest, but the oldest botanical garden of America is neither in the United States nor in Canada. For real age, one must turn to the West Indies. The garden at St. Vincent is more than 150 years old and still going strong while Trinidad has recently celebrated the hundreth anniversary of the founding of its garden. Bath garden in Jamaica, though now fallen almost into disuse, was founded nearly 150 years ago and is a close second to the garden at St. Vincent in seniority. East's garden also in Jamaica, was a few years older than the garden at Bath, but it has long since been abandoned. The Jamaican gardens still in existence are much younger. Castleton garden has been in operation about sixty years and Cinchona for nearly as long. The best known garden, Hope, near the city of Kingston, dates from 1873. If there are any gardens in the New World that have a span of life approaching the oldest of these, we would be glad to hear of them.

Effects of Light on Fruiting.—Nearly everybody has noticed the tendency of plants to bloom most profusely during the colder parts of the year. Winter, instead of summer, should be represented as garlanded with flowers. Summer has its blossoms to be sure, but the profusion of flowers in autumn is exceeded only by the burst of bloom in the spring. While most of the plants that bloom during the cooler part of the year are restricted to one or the other of these seasons, there are a few, such as the violets, that bloom both in spring and autumn or perhaps they bloom from autumn to spring and are repressed only temporarily by the coldest weather. There is, however, a considerable body of evidence to show that it is the shortness of the day, rather than the cold that induces blooming. Two Government botanists, W. W. Garner and H. A. Allard have been conducting a long series of experiments which seem to settle the matter. They find, however, that plants may be divided into two different categories as regards their response to different periods of daylight. In one, a long period of light induces flowering; in the other it hinders the process. Acting on this knowledge, they have been able to bring the spring flowering *Viola fimbriata* into bloom a second time in July by simply reducing the length of time the plant is exposed to the light each day. On the other hand, the rose mallow, (*Hibiscus moscheutos*) which normally blooms in summer, was not able to flower at all when its light exposure was cut down to seven hours daily. From this the gardener ought to get a hint on growing superior salad-plants. Lettuce and spinach are noted for "running to seed" in late spring and early summer, but by reducing their supply of daylight this tendency is quite eradicated. In the case of the scarlet globe radish which, planted in May, was deprived of some hours of light daily, it continued to vegetate through the sum-

mer and winter in the greenhouse and showed no sign of flowering though steadily increasing in size until the root reached a diameter of five inches and the leaves were eighteen inches long. Exposed to the full sunlight the following summer, it promptly blossomed. This effect of different periods of light is also held to account for certain phases of plant distribution. Annuals, it is well known, are nearly absent from the tropics since the short days there do not require plants to exhaust their energies in seed production. Outside the tropics, however, the lengthened summer day may speed up the blooming season with the result that the plants become annuals.

Fringed Gentians.—Fringed gentians do not grow near my home, so last fall a friend sent me a large boxful from Massachusetts. The books say a plant of fringed gentian may have as many as thirty of the showy flowers; twenty was the most on mine. They were all asleep when they arrived and in spite of coaxing would never open of their own accord, thus showing their relation to the bottle gentian. My fingers spread the petals and their blueness and irregular fringe were enjoyed. When discarding the bouquet two weeks later, a stalk with a fragment of freshness and a bud was noticed. This last stalk was kept in a vase of water near the radiator where much heat is often felt and on the fourteenth of October without any help from me the corolla spread naturally and was the only one that did so. The smallest and palest of all and yet the one that behaved the best. For eleven days it opened in the morning and closed in the evening and then losing the power to move it stayed open all the time and not until the first of November did the edges curl up and really fade after nineteen days of life. It was frailer than those that developed out of doors, but I wonder if they can boast of so long a life.—*Nell McMurray, Clearfield, Pa.*

CULTIVATING YELLOW LADY'S SLIPPER.—I am a great admirer of our native orchids but have never been successful in growing them though I have given them leaf-mold, abundant moisture, and supplied their wants as well as I knew how. A year ago I decided to make one more trial and bought three plants of the small yellow lady's slipper. All lived through the winter and appeared promptly in spring but seemed very frail and weak. They had about reached the point where I felt they should not be left alone nights when I read that oak leaves and twigs added to ordinary soil would produce the acid condition of soil necessary for the health of bog-loving plants. I immediately procured some oak leaves, and after chopping them very fine mixed them very thoroughly with the soil. In a short time the plants began to stiffen up, whether from rheumatism or increasing vigor I cannot say, and while they did not bloom they bid fair to go through another winter and I hope for blossoms next year. Needless to say I shall add all available oak leaves to the compost for my boggy beds next year—that is, unless somebody tells me it is all wrong! —*Adella Prescott, New Hartford, N. Y.*

EDITORIAL

Ask any resident of the South to name the most beautiful flowers of that favored region and he will at once mention the crepe myrtle, the azalea, the dogwood, and perhaps the Cape jessamine. No matter what other plants he names, he is pretty certain to put the crepe myrtle first. Though this plant has not yet reached the dignity of a national flower, it has at least become a sectional obsession, like corn bread and fried chicken. It is quite possible, however, that the Southerner is quite justified in his position. When the crepe myrtle has reached maturity and some time in early summer bursts into a living cloud of watermelon-pink, it is truly one of the most beautiful of shrubs in this or any other country. It is a perpetual delight to the eye, regardless of its location and always has a certain dignity of bearing about it, whether bending in shelter over the humble cabin of the negro or flashing from the shrubbery of some lordly estate. Mahomet, who advised one of his followers with two loaves of bread to sell one and buy some narcissus flowers because bread is merely food for the body while flowers are food for the soul, doubtless never saw a crepe myrtle in bloom. The narcissus at its best is a handsome flower, but, even at its best it is no match for this resplendent shrub. In northern gardens several of the lilacs might be thought not unworthy to compete with the myrtle for the crown of beauty. The Persian lilac, especially, seems at times only a smaller copy of its Southern rival. But

who are we to make comparisons? Neither plant is a product of the region that claims it. Though both have long been grown in this country, the crepe myrtle is a native of India and the Persian lilac, in spite of its name, comes from China.

BOOKS AND WRITERS

The Reviewer and his best friend the Editor, have been in the South all summer. * * * The Editor has been teaching, * * * Our desk is still several inches deep in things to be reviewed. * * * We think it is an oak desk but we have not seen the top for so long we are not sure. * * * The things that might be reviewed and the things that ought to be reviewed are all mixed up. * * * We shall have to mention them all, we suppose. * * * We hear that Walter Stager has published a book on Irises, but we haven't seen a copy. * * * This might be construed as a hint to the publishers. * * * Scribners have published a book on "Hardy Perennials" by a British writer. * * * We expect to say something more about it later. * * * Dr. Edward Blake Payson has sent us a copy of his Monograph on the genus *Lesquerella*. * * * Lesquereux knew all about the mosses, but the really big thing he did was to get this genus named after him. * * * Payson says there are more than fifty species in it. They are all rather insignificant plants of the Rocky Mountain region. * * * The account of the Gray Herbarium expedition to Nova Scotia has been printed in a single volume. * * * It was originally published serially in *Rhodora*. * * * The Gray Herbarium itself did not go, but several of the Staff did. * * * It required more than 200 pages to tell

of all the new, rare, and otherwise interesting plants found. * * * And some folks thought all the new plants in Eastern America had been discovered! * * * A new fern book is coming out in time for the Holidays. * * * Rev. Geo. B. Tilton, the author, says it will be called the "Fern Lover's Companion". * * * It ought to be well received; there are only two other volumes on the subject in print. * * * C. A. Weatherby sends us a copy of his paper on the Group *Polypodium lanceolatum* in North America. * * * It is published in "Contributions from the Gray Herbarium of Harvard University." * * * We sent him one or two observations on a rare species from South America that in some way has moved into Jamaica. * * * In the same publication, J. Francis Macbride upsets a lot of Rydberg's highly ornamental names in the genus *Parosela*. * * * They are having a delightful " 'tis" and " 'tisn't" time and nobody else is the wiser. * * * Macbride must be a friend of Piper's. He says that Piper's revision of *Allocarya* is one of the finest. * * * He thinks the *American Botanist* is impolite in poking fun at a genus of 79 species founded on the way the seeds are wrinkled. * * * But we could not swallow all those seeds! * * * Wonder what he would do with a quart of dried peas * * * The *Gladiolus Bulletin* has begun publication. * * * It is edited by Stanley Thorpe of Medford, Mass. * * * Lee R. Bonnewitz is issuing a series of *Garden Notes*, principally on irises and peonies. * * * Looks as if it might develop into another plant journal. * * * It is published at Van Wert, Ohio. * * * We learn from the Secretary of the "Society for the Protection of Native New England Plants" that it is not an additional society but a combination of three others of similar nature. * * * This may account for

the seventeen-syllabled name * * * The Massachusetts Horticultural Society has issued an excellent list of Wildflower literature. * * * Most of the worth-while books are in it. * * * The "First Book of Grasses" by Agnes Chase is announced for publication by the Macmillans. * * *If the author can make the identifications of the grasses easy her book ought to be one of the "best sellers". * * * However, a book in the hand is worth two at the publisher's and it is time we turned our attention to some of those in hand.

From the Oxford University Press, comes a neat little volume entitled "Junior Botany" by T. W. Woodhead. This is designed for use in British schools where a larger volume is impracticable and is a good illustration of how they do things "on the other side." In the main the subjects discussed are similiar to those that make up the contents of American school books on the same subject, though the latter usually touch upon several phases of botany that are not mentioned in the present book. By substituting American plants for the European species used for illustration the book would be quite suitable for class work in the United States. "Junior Botany" is described as a simplified and abridged edition of the author's "Study of Plants" and has apparently been written with a view to enable the beginning student to classify his specimens. This aim of botanical texts, it may be said, has largely been discarded in America in favor of studies in ecology, the lower forms of plant life, economic plants, and the like. The book will be of interest to all teachers for the light it throws on the methods of teaching botany abroad. It is published by the Oxford University Press, American Branch, New York.

Four more parts of O. Penzig's "Pflanzen-Teratologie" have been received from the press of Gebruder Borntrager, Berlin, Germany. Earlier numbers of this work gave a very

extended account of all the abnormal plants known, and listed the polypetalous dicotyledons in which such abnormal plants have been found. The parts just received continue this list through the gamopetalous dicotyledons, the monocotyledons, the conifers, the ferns, mushrooms and even the algae. Under each species are described all the abnormal forms reported for it and the place of publication of each example is given. In preparing this work, the literature of the whole world seems to have been carefully searched. Those who are engaged in the study of plant "freaks" will find this work simply invaluable for reference. The price is $6 unbound.

Dr. William Mansfield's "Botany, Developmental and Descriptive," is a textbook designed for use in high school and college but one that favors a type of work quite unlike that which ordinarily finds a place in such institutions, because it is frankly an introduction to classification. Such books, however, are still in demand by students of medicine and pharmacy where the identity of a given plant is often of prime importance. Judged by its usefulness for the purpose intended it seems to have very little in it that cannot be heartily commended. It may be said, however, that although it is logical to begin such a book with the one-celled algae and end with the highest flowering plants, this is not the order likely to appeal most strongly to beginning students. We should have been inclined to reverse this arrangement. The forms taken as examples are carefully and accurately described and the 135 illustrations are mostly new and made from photographs of drug plants. The text is remarkable for the number of simple declarative sentences it contains. To those familiar with botanical literature, the book is likely to recall Gray's "Lessons with Plants" and Rusby and Jelliffe's "Morphology and Histology of Plants". For present day purposes, how-

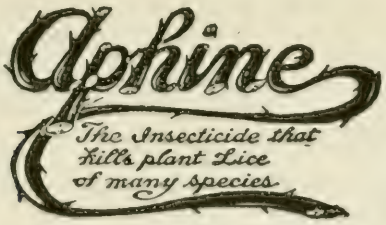
ever, it is probably better than either. Certainly the student interested in the basis of classification will find this a clear presentation of the subject. The book is a 12mo of 232 pages and is published by Lea and Febiger, Philadelphia.

A new laboratory Manual for the study of biology is W. H. D. Meiers' "Study of Living Things". It consists of a pad of 96 sheets, each sheet containing various questions to be answered on a given subject ranging from algae and garden-making to teeth, houseflies and bulb-growing. The questions are pertinent and well selected but it strikes the reviewer that a few are rather impracticable, at least with students in secondary schools. Take the fourth exercise, for instance, in which the student is asked to discuss the helpful and harmful factors in the environment of a plant and to decide whether the plant is spreading or losing ground. This could scarcely be decided with any degree of accuracy by a child in a single season. Older students would find such an exercise less difficult and even the average teacher might discover food for thought in many of the questions. The work is bound in paper covers and published by Ginn & Co. The price is 80 cents.

At a time like the present, when eminent Chautauqua lectures and Southern legislators are doing their best to convince the public that there is no such thing as change, a reprint of Samuel Christian Schmucker's "The Meaning of Evolution" is most appropriate. It is not likely that any thinking person really doubts the facts of evolution, though like the scientists, themselves, he may question the explanations of many of its phenomena. Dr. Schmucker's book is an elementary treatise, devoid of technicalities and designed to meet the needs of the general reader. In twelve chapters covering upwards of 300 pages, he discusses the evolution of the idea of evolution with a reasonableness that must appeal to all who

read the book. There are chapters on adaption in species and individuals and one on the evolution of the mammals. The reader may doubt some of the conclusions drawn by the author in the chapters on the future evolution of man, and science and the Book, but these are not pertinent to the main subject and may be disregarded if desired. The fact that the book has been reprinted four times is some indication of its popularity. It is published by the Macmillan company, New York.

But the supreme gift of the fall, that which not seen leaves the year uncrowned and one's memory the poorer, is the gentian whose twisted buds open to the September sun and rarely as now brave the winds of November. The gentian is a typical wildflower, resenting cultivation, shy and capricious in habit. It may be sought through the livelong day and turning you have at your feet, a dozen erect stems raising their flowers to the sunshine. One year a low meadow will be blue as the sky above, the next not one is to be found. But the flower itself is openhearted and frank in expression, gladly giving its message of cheer quite unlike its sister the closed gentian whose vase-shaped, dark purplish-blue buds never open. They puzzle their new acquaintance who vainly watches for their unfolding, and their sinister aspect might repel even their true lover and tempt him to relegate them to a place among the mystic herbs gathered in the full of the moon for a witches' cauldron.—Martha B. Flint.



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THE AMERICAN BOTANIST

FEBRUARY, 1923

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WILLARD N. CLUTE, EDITOR

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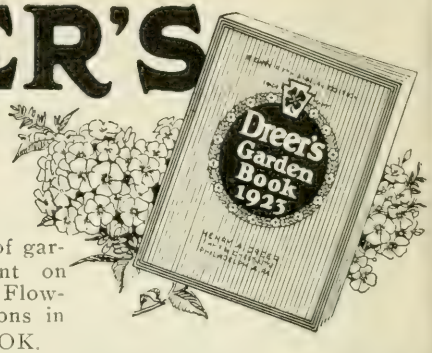

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The Resurrection Fern—*Polypodium incanum.*

THE AMERICAN BOTANIST

VOL. XXIX FEBRUARY, 1923 No. 1

High in the air the maples show
Their first faint tints of crimson glow;
Hazel and poplar everywhere
Are sifting pollen on the air;
From plumy elms in gray and brown
The bud-scales shimmer softly down;
The mourning—cloak is on the wing
And wandering breezes whisper, "Spring."

THE RESURRECTION FERN

By WILLARD N. CLUTE.

EPIPHYTES are not abundant in temperate regions. At best the list includes only a few algae, mosses and lichens with no suggestion of higher forms such as the ferns and flowering plants, but as the tropics are approached the variety of epiphytes increases enormously until in the rain-forest bordering the equator a host of orchids, ferns, pitcher-plants, bromeliads, peppers and numerous other flowering plants crowd the branches of the giant forest trees.

In our Southern States we find the first outlying colonies of the flowering-plant epiphytes in the gray or Spanish moss (*Tillandsia usneoides*) which is not a moss at all but a member of the pine-apple family in good, regular standing. With it grows the subject of our sketch, the gray polypody or resurrection fern (*Polypodium incanum*). The species, through growing in the same general region divide the territory between them, the *Tillandsia* preferring the upper branches

of the trees from which it hangs in long festoons, while the polypody forms colonies on the trunk and larger limbs.

The polypody derives its name of resurrection fern from its habit of curling up during dry periods and apparently coming to life again when it rains. The plant does not actually die during the drouth but remains in a state of suspended animation much as our perennial plants do in winter. The drough is the polypody's winter. So fixed is this habit in the plant, however, that even when it is dead and reduced to a mass of brown and dry vegetation, it will spread out its fronds if soaked in water. It is, however, a somewhat difficult matter to know when such a plant is really dead for cases are known where specimens have survived for more than a year without water.

There are an immense number of plants in the world which have the ability to renew growth after a period of dessication. Often they are rooted in the soil as in the case of *Selaginella lepidophylla* another resurrection fern which, is misnamed for it is not a fern though closely related to such plants. This plant curls up into a compact round ball when dry and is frequently offered collectors of curios. Various flowering plants have the habit of resting thus especially in the rain forest. Here, however, the period of drouth is likely to be of short duration and therefore offers no such test of vitality as our polypody must often undergo. Since it grows as far north as southern Illinois, it must often encounter both drouth and cold. It is well equipped for the battle, however, for its fronds are closely set with tiny brown and gray scales which enable it to hold tenaciously any moisture it may absorb. Our frontispiece is from a photograph showing a colony of these plants on the base of a large oak and was made in Florida by Mr. W. M. Buswell.

BOTANICAL NOTES FROM TAHITI

By J. O. Stancliff.

THE silk-cotton or kapok tree forms a striking part of the scenery of Tahati. In its spring garb it is covered with pensile, somewhat banana-shaped cotton pods which hang full to bursting. The cotton is fine for packing shell necklaces for mailing to small nieces at home.

The steamship folder says Papeete is situated in "a forest of flamboyant trees" but the principal trees embowering the harbor front are a form of locust which a writer calls algaroba and which a high authority in far-off Washington says is *not* the carob tree but a near relation thereof. The hard-shelled fruit contains a sweet pulp which is inedible unless possibly it is relished by stock.

"Flamboyant trees" have now a lacy green foliage, a few red blossoms, and their fruit. A medium sized tree with bare branches like a buckeye, or branches beginning to be leafy, bears now fragrant white and cream-colored magnolia-shaped blossoms. Some call it the French pine from its use by the French in cemeteries, but I am told that the natives have a sort of superstitious horror of it. The small pink blossoms of lofty cassias strew the streets in places, *Bougainvillea* is now covered with gay lilac-hued flowers, and at Faaa, the next village west of Papeete, a fine vine is smothering a half-dead flamboyant with its lilac blossoms. At Faaa too, is a huge banyan.

Lantana is a sturdy bush which here spreads and forms dense brambly thickets. It has very attractive flowers of a bewildering variety of combinations of pink and yellow. It is however, considered a great pest by planters on account of its impenetrable tangles. It is found also in the Fiji's. I am told that it was introduced here by a French missionary who imported it for his flower-garden.

A hibiscus species known as purau has lemon-colored blossoms very like cotton-tree blossoms and very tough bark used locally as cordage. The cotton-trees in the yard of Mr. Campbell in Papeete are ten or more feet in height, bearing buds, flowers, and both green and ripe bolls at this time. These plants are also found in a wild state.

A species known as black acacia bears large white globular blossoms and forms dense jungles amongst coconut groves if allowed to grow. Another species with small yellow flowers deliciously fragrant, seems identical with the Texas acacia. Tamarind trees are frequently seen, mostly in green pod. Coming back to the ground one first sees a long-stemmed, dark red pea-shaped blossom on a species of weed commonest along the surfless, reef-protected beach. Various tough yellow-blossomed mallow weeds are used to make the brooms used by the local "whitewings" who are convicts. The pink-flowered sensitive plant has smaller blossoms than the familiar *Morongia* of the southern United States. A cucurbitaceous vine with rather small yellow flowers is also found pretty much everywhere in the country. It bears small ornate "pumpkins" like fairy lanterns. A small-flowered species of *Passiflora* is also abundant in places.

The dayflowers (*Commelina*) are of two kinds, a small-flowered running kind with the third petal blue and a larger flowered kind with the third petal white. The first is by far

the more numerous and forms extensive beds far up the Fantana valley where it narrows. The only "dandelion" I have found is bright red, with branched and somewhat leafy stems that are several flowered. There is also a faded pink edition of this same flower, mostly on the eastern side of the Island. At one point of the shore road near Papeete, I found *Sonchus* in a verdant spot at the foot of a bluff where it grows with a double-blossomed fabaceous vine, the dayflower and others. I have since seen it elsewhere. A blue vervain is common, quite bushy in favorable locations and bearing florets which seem large for this genus. There are two species of *Baptisa*(?) just as in the Gulf States, one slim-spiked, the other larger flowered.

The common *Convolvulus* is small-flowered and heart-leaved with a concealed, deep-red center. The sweet potato of the islands is also a Convolvulus with purplish pink flowers.

Another species has yellow blossoms borne in clusters which at a little distance are in appearance not unlike a large Chrysanthemum. Still another grows on the sands of the beaches and has large somewhat fleshy round leaves and large purplish-pink flowers. A heart-leaved species of the same shade grows along roadsides.

A plant almost exactly like *Mitchella repens*, but with larger and more succulent fruit, grows in moist woods, especially near waterfalls. A certain tenacious plant known locally as false tobacco is a troublesome species. I have often seen it near Houston Texas. There are at least two *Eupatorium* species, I think, in Tahiti. A herb-like or somewhat bushy mallow with large red-centered yellow nodding blossoms grows commonly along the Papeete-Faaa stretch of beach road. In one spot only, not far from a deserted residence, I found some very atractive deep-blue pea blossoms corresponding to *Cli-*

toria mariana of the Southern States except in color. They grew on vines twining over the roadside. A small tree called piti by the natives is very abundant and bears handsome yellow trumpet-shaped flowers like those of *Gelsemium sempervirens.*

The first fern one sees in quantity is a pedate maidenhair-shaped bracken species. It is found on all dry hills. The ferns of Tahiti are most interesting. They grow in all shapes,—broad, narrow, parsol-like, fan-shaped,—and on rocks, on trees—anywhere, apparently. They grow to the sizes of small trees and some are even said to have trunks like trees but I did not happen upon these last during my limited stay in Tahiti. I found *Lycopodium* but once, near Taravao where the ocean nearly cut the island in two. I think the species is *L. cernuum.*

A little triangular fern and a delicate maidenhair are found up the Fantana and elsewhere. There is also a fern resembling precisely *Onoclea sensibilis.* In a book by F. W. Christian descriptive of the Marquesas, mainly, will be found a list of the Marquesan ferns which in many respects are like those of Tahiti. Another remarkable feature of Maiatea valley is the mistletoe and other hanging vegetation growing on the horizontal branches of trees. The enormous dark arrow-shaped leaves of the wild taro are commonly seen in the narrow valleys and along shady stream banks.

One of the finest plants of the South Sea Islands is the mango-tree whose oval, golden fruits are now ripening under the hot tropical sun. Not even the large-leaved bread-fruit can excel it, nor can those magnificent feather-dusters the cocoanut palms, nor the spiny dark-leaved citrous trees with their piquant globes. Last but not least in the golden mango tree.

BOTANY FOR BEGINNERS—V

By Willard N. Clute

We take the plants and animals of this world so much as a matter of fact that we seldom pause to consider the important and remarkable differences that separate them from all other members of creation. When we do investigate the matter, however, we discover that plants and animals are the only things we know that are alive. But when we ask ourselves what this aliveness means, or in what it consists, we may be puzzled for an answer. As regards the fundamental substances out of which all living things are made, they do not differ in any essential way from the substances found in lifeless material elsewhere. A little carbon, oxygen, hydrogen and nitrogen and still smaller quantities of sulphur and phosphorus are all that Nature needs to form living matter, while to carry on the business of living, such matter requires only minute amounts of iron, calcium, magnesium, potassium and oxygen.

But life does not consist of these elements or of any combination of them. Life is far subtler. Its grosser manifestations are indicated chiefly in theability of the organism to take to itself additional particles of the substances mentioned, to build them up into new combinations useful to it, and to excrete or throw out matter no longer of value. Moreover, when the elements are combined in the form of animals or plants, they are affected by time and have a youth, maturity

and old age. In the end they die and the elements of which they were formed become disassociated and may again form part of other organisms, but the elements themselves have neither a youth, maturity, nor old age that can be measured by our common time standards. But though the individuals may die, the group to which they belong does not disappear because it is constantly being renewed by processes of reproduction which all possess whereby, on coming to maturity, they give rise to smaller and younger organisms like themselves. Lifeless matter cannot reproduce or increase in this way; in fact, no new forms of living matter originate of themselves. All life from pre-existent life is the law.

To carry on the business of living, or in any other activity, a certain amount of energy is needed. This energy plants secure from the sunlight, by means of the green coloring matter known as chlorophyll. This color is able to change some of the light energy falling on it to electrical energy and by means of this, plants combine hydrogen, oxygen and carbon into foods, which, like storage batteries, hold the energy until it is desirable to release it. Oxidizing the foods releases the energy. This latter process is called respiration and is practically equivalent to breathing, as commonly understood. The animals lack this green coloring matter and cannot make food for themselves. They therefore rob the plants for their own uses. Even man, himself, finds it necessary to do this.

The simplest plants consist of single cells but the size of such organisms in no way limits the functions that distinguish living things from non-living. Although most of the plants with which we are familiar are made up of vast aggregations of cells, there are many one-celled organisms on the earth. Practically all of the germs that cause disease in man, the other animals and the plants are one-celled, while it is well known

that even the highest plants begin as single-cells. In the main, however, the tide of life has flowed on to larger and more complex forms. Among the plants this tide might be said to be heaped, here and there, into waves, or the situation might be likened to a mountain range in which an occasional lofty summit rises above its fellows, with many lesser peaks about it which are themselves surrounded by foothills. One of these summits might be labeled algae and fungi and imagined to consist of some eighty thousand different forms, or species. A near-by peak may be thought of as representing a group of nearly twenty thousand mosses and another, slightly smaller, may stand for the ten thousand ferns. Then, towering over all, the mightiest summit in the vegetable world comes that peak representing the flowering plants, more than one hundred and fifty thousand in number.

All the groups mentioned have their devotees; indeed, some small division of one group may provide interesting employment for a lifetime. Favorite groups for study are ferns, the mushrooms, the algae, the grasses, the asters, the lichens and the hawthorns. One American botanist is widely known for his studies of the slime moulds, and another for his work on the Laboulbeniaceae, a group of more than 150 species of fungi so small that they live on the bodies of beetles. Before you can study such plants you must catch your beetles and buy a compound microscope!

The flowering plants, because of their beauty, attract by far the greatest number of students. Not all flowers are beautiful, however, or even conspicuous, for that matter. There are some so insignificant in size that they consist of only a single stamen and carpel which cannot be seen without a high-power lens. From the plant's standpoint, however, such an insignificant flower may signify perfection, for the sole

business of the flower is to produce the pollen and ovules whose contents, united, will give rise to a new plant. But we must not hastily assume that nature is satisfied with pollen and ovules from the same flower. Far from it. She has ten thousand ways of securing pollen from distant flowers and preventing the flower's own pollen from being used at home. The two agents commonly depended on for transporting the pollen are the wind and the insects. The wind works for nothing but the insects have to be beguiled by nectar or extra pollen, and directed to these supplies by color, odor, nectar-guides and properly shaped corollas.

Wind-pollinated flowers are naturally dull-colored for there is no use in wasting the refinements of color on anything so unappreciative as the breeze. Such flowers produce large amounts of pollen to insure that some at least will be borne to the waiting carpels. The pollen is light in order to travel long distances before coming to the earth and it is usually scattered before the leaves are spread. Most of our early spring flowers have this type of blossom. It appears clear, then, that all our most beautiful flowers are in a very real sense, presented to us by the insects. Not that the insects have acted consciously in the matter, but it is certain that without the insects, flowers would all have been much like those of the pine, hazel, grass, cat-tails and alders.

Flowers pollinated by the insects are more certain that their pollen will go by the most direct route to other flowers and therefore do not find it necessary to produce so great an amount of pollen, but the problem is not as simple as this. There are small creeping insects to be excluded for they would only waste the pollen,. Various schemes must be devised to secure the visits of the insects and get them well dusted with pollen when they appear. Some flowers are run wide-open

and all who will, both large and small, may call and enjoy the feast, but our better kinds of blossoms are more aristocratic and entertain only a select few. These shut out the small insects by numberless devices, or they store the nectar in nectaries so deep that only the larger insects can reach it. Moreover, many of them have learned that if the flower is turned sidewise the insect must always alight in the same place and in consequence the pollen supply, if borne in the right place, may be still further reduced. The wild rose, which is spread open to all comers, may have a hundred or more stamens, but the number in the flowers that face sidewise is seldom more than ten and usually only five. Indeed, the mints and figworts have but four stamens in each flower, or often only two, many of the orchids get along with a single stamen, while the canna manages to be pollinated with only half a stamen.

THE CHARM OF BARE BOUGHS

By Adella Prescott.

IT is quite the fashion among a pessimistic class of people to speak of autumn as a period of death and decay and to bewail the coming of the cold and dreary winter. I am not very fond of cold weather, myself, but every season has its own special attractions and to me one of the charms of autumn and winter is the unburdened trees. The bulbous and herbaceous plants of our north-land seem to regard the winter as strictly a rest time, a few leaving a tuft of green leaves to cheer the pessimist, but most of them cuddling down into the soft warm soil for a long nap.

The trees take it as a vacation period, when all their duties and responsibilities falling off with the falling leaves, they refresh their souls with a wide outlook and stretch their light-

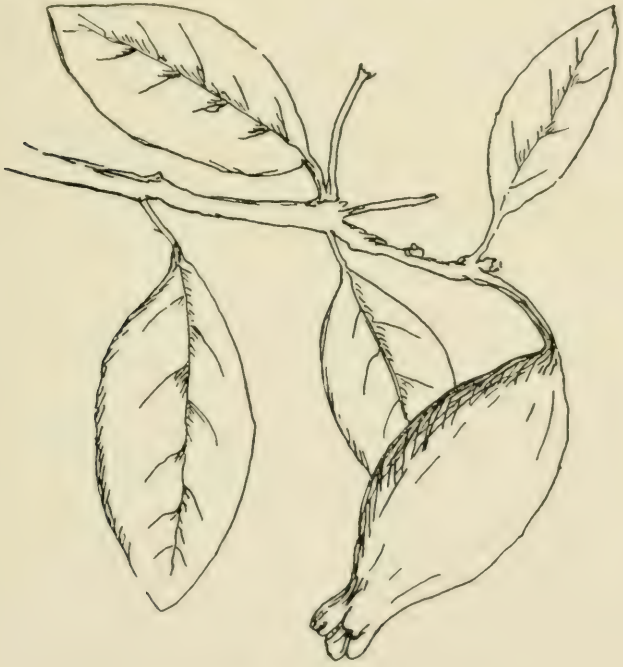
ened limbs in many a gleeful frolic with the winds. In summer the burdened branches sway slowly and reluctantly in the light breeze and thrash heavily in stronger winds, but in winter every twig and branch responds lightly and lithely to the sweeping gales.

Never is the beautiful structure of trees so noticeable as when the softly blending leaves have fallen, leaving each curve and angle to stand out sharply against the wintry sky. And how varied these curves and angles are! Not only has each tree its own characteristic way of reaching out to the light but each twig solves its own problem to suit itself and the eye finds an unfamiliar source of interest in following these solutions as revealed by the nudity of winter.

The sycamore flings its gaunt and ghastly branches wide open to the sun but it is hard to believe that life remains in its body, so ghostly is its appearance. It is one of the most striking landmarks of the wintry landscape and even a careless eye can hardly miss it. At the other extreme are the pothooks of the horse-chestnut which looks like sooty iron and by rights should be hanging in a roomy fireplace rather than from the limbs of a tree. Between these two extremes there are many variations from the wand-like branches of the willow to the stouter twigs of the beech and maple.

Not less interesting than the many variations of angle and curve is the bark which is largely hidden by the leaves in the summer. The sycamore owes its ghostly appearance mainly to the color of its bark, but for sheer beauty I think the beech surpasses all others though the "tatterdemalion birch" with its rags and tags of silken tissue in silver or golden-brown is a close second. The golden bark of the willow, the shining red-brown of the wild cherry and the deep red twigs of some of the dogwoods are some of the most striking examples of varia-

tion in color but the number is as many as the trees; and the texture varies even more perhaps than the color. Surely with all this waiting just outside our door or window, we have only ourselves to blame if we find winter devoid of interest and charm.



FEIJOA SELLOWIANA

THE warmer parts of the world possess a wonderful variety of fruits which are rarely seen in temperate regions for the reason that they cannot be produced outside of the tropics except under glass, while their perishable nature prevents their being shipped to distant markets. Even the names have a foreign sound as sapodilla, cherimoya, mangosteen, guava, grandilla, star-apple, ceriman and durian. Some of the

hardiest of these, however, are finding their way into the gardens of the South and West and are thus becoming more widely appreciated. This is the case with the fruit shown in our illustration which though grown in California is still so rare as to have no common name. Botanist call it *Feijoa Sellowiana* but from its looks, taste, and habitat, it might well be known as the Argentine guava.

Feijoa Sellowiana belongs to the Myrtaceae or Myrtle Family, a group of some thirteen hundred species found mostly south of the equator and especialy common in South America and the East Indies. There are no species native to North America but the pomegranate, commonly cultivated in southern gardens, is much like the Myrtaceae in appearance. Among species of this group well known by name at least are allspice, cloves, Surinam cherry, rose apple, Jambolan plum, bottle-brush, eucalyptus and Brazil-nut.

The name of the family is derived from the classic myrtle of Europe. This latter species is possibly more famous for yielding the bay-leaves commonly used in cookery. As a matter of fact the leaves of most of the group are dotted with tiny glands containing a fragrant oil and the fruits usually have a pleasant odor as illustrated in the allspice. This is true of *Feijoa* fruits whose odor suggests that of the Cape jessamine (*Gardenia jasminoides.*)

The fruits themselves are two or three inches long, and about half as thick, broadest in the middle and tapering toward the ends. The end opposite the stem is crowned with the remains of the four sepals. The fruit is green when ripe and has a rather thick skin surrounding a pale reddish, somewhat watery, pulp that is sweet and edible, with a flavor that has been likened by different people to that of pineapples guavas, bananas and strawberries. To the writer it suggests

the odor of buckwheat honey with a hint of cloves. From this it might be inferred to approach in flavor the mangosteen (*Garcinia Mangostana*) which is said to include in its pulp the flavor of all other fruits and to be the fruit with which the Serpent tempted Eve.

Feijoa comes from the Argentine and is likely to find a welcome wherever it can be grown. It is said to be popular in Southern France. It is a medium-sized tree with small, oblong entire leaves white beneath. The fruits are produced singly along the twigs and at their tips. We are indebted to Mrs. Jay C. Jenks, of Halcyon, California for the fruiting specimen here figured.

VALUE OF PRACTICAL BOTANY

A SHORT time ago the writer attended a farmers' field day that was in charge of the county agent. The county agent was a well trained man, a college graduate, as was evidenced by the ease and accuracy with which he answered question after question. Finally a farmer aproached with a specimen of one of the common weeds growing in the pasture and requested that the plant be identified. For the first time that afternoon the county agent fell down on the job.

A specimen of plant was received from a county agent last summer with the explanation that it occured abundantly in alfalfa fields in his county and threatened to become a serious alfalfa weed. Upon examination the plant in question turned out to be a dwarfed specimen of common alfalfa.

These incidents are cited because they illustrate a general condition among trained agriculturists, a lack of knowledge of many of the common plants that grow on our farms. Many men who are well trained in other phases of agriculture, ex-

hibit lamentable ignorance concerning common farm weeds. This condition may be due in part to the unfortunate manner in which the general study of systematic botany has fallen into a state of neglect. Had the county agent who sent in the specimen of alfalfa learned to recognize the plants by their botanical characteristics, it is doubtful if he would have made so foolish and embarrassing a mistake. Perhaps the old-fashioned method of dissecting flowers in the laboratory can be made more attractive and profitable to the average student by a field study of the weed flora and approved methods of eradiaction and control.

It is suggested, then, that men in agricultural courses should make an effort to learn to recognize the common weeds and familiarize themselves with the methods by which troublesome weeds may be controlled. A great deal of this knowledge can be gained during under-graduate days by collecting specimens during hikes into the country and by identifying them and becoming familiar with their characteristics.

A knowledge of the farm flora may prove an asset in almost any field of endeavor that the trained agriculturist may select, from practical farming to teaching or demonstration work. For example, a specimen of a plant received some time ago from a college trained farmer with the statement that the sender was acquainted with most of the wild plants growing upon his land, but the specimen sent was new to him. It turned out to be the black knapweed or star thistle (*Centaurea nigra*), a plant that is not common in the United States but considered extremely troublesome in Europe. The sender was advised to destroy immediately the few plants upon his farm before seeds were matured. This was done and no further trouble was experienced. It is entirely reasonable to believe that his knowledge of plants enabled the farmer to

recognize the stranger upon his land and it is possible that his foresight may have saved his community from the ravages of a new weed pest.

New weeds are constantly appearing in our midst, as witness the Russian thistle sow thistle, and Russian pigweed, and more recently the lawn pennywort and leafy spurge. Not only are new weeds introduced from abroad, but native weeds are carried from one section of our country to another. Thus the blue sage (*Salvia lanceaefolia*), a western weed, has recently appeared in Ohio alfalfa fields where it was carried by the agency of impure seed from the west. The bracted plantain (*Plantago aristata*), one of the species designated as noxious in the recent Indiana Seed Law, is a western species that has been widely introduced in the east by means of baled hay and impure grass seed. A knowledge of the farm flora is of distinct advantage in recognizing new weeds and may be of considerable value. If the first patches of Russian thistle had been recognized as a new weed and immediately destroyed, the saving to agriculture would have been great. The farmer should be ever on the alert for new weed pests, but it is first necessary to become familiar with the common plants occuring in our fields so that strangers can be immediately recognized and adequate eradication measures instituted.

Entirely aside from the practical value, the pleasure derived from a knowledge of plants is worthy of consideration. Such a knowledge has a recreational value that cannot be estimated in dollars and cents. The joys of country life may be greatly enhanced with the surrounding flora. It is an inspiration and a pleasure that cannot be valued by the ordinary standards.—*Albert A. Hansen in Purdue Agriculturist.*

PLANT NAMES AND THEIR MEANINGS—XIV

SCROPHULARIACEAE

By Willard N. Clute.

THE Scrophulariaceae comprises some 2500 different species very widely distributed over the earth but most abundant in the Temperate zones. Many species have a close superficial resemblance to the mints (Labiatae) since they possess square stems, opposite leaves and two-lipped flowers but the flowers are much larger, though generally lacking fragrance, and they are more commonly borne at the top of the stem in panicles and thyrses though Gray says that none have a truly terminal inflorescence. The most trustworthy character for separating this group from the mints is found in the fruit. In the Scrophulariaceae this is a many-seeded two-celled pod; in the Labiatae the fruit breaks up into four nutlets. The group derives its name from the genus *Scrophularia* which is said to be so named because used for the cure of scrofula. The plants of this genus have long been known as figworts, and by an extension of the name the members of the entire family are so called. The plants in no way resemble figs, however, and the true fig does not belong to this family. The origin of the name may be found in the notes on figwort. By some the family is called the Rhinanthaceae for the genus *Rhinanthus*.

As in the mints, a large number of the Scrophulariaceae have reputed or real medicinal properties. After *Scrophularia* whose derivation as we have just seen refers to its reputation in the treatment of scrofula we may mention the genus *Gratiola* derived from *gratia*, grace, in allusion to its usefulness in medicine. *Euphrasia* named for one of the Graces means delight

or cheerfulness and is applied to a genus of plants for their medicinal virtues. It is said that *Odontites* is an ancient plant-name derived from a Greek word meaning tooth and reputed to be good for the toothache. The plant which now bears the name, however, fails to live up to this reputation. Among medicinal plants, also, is probably to be included *Pedicularia* derived from a word meaning louse. Gray says the name has no obvious application but Wood states that the plant was formerly used against lice. An old belief is that this plant bred lice in sheep that happened to feed upon it. The reader will therefore choose the derivation that most strongly appeals to his fancy.

In several instances the flowers have suggested the names of the genera. In *Chelone,* for instance, the name is derived from a word meaning turtle and is given in allusion to the flowers, like a turtle's head. The open corolla of *Mimulus* suggested the grinning mouth of an ape, *mimo,* hence the diminutive name. The peculiar corolla of the snapdragon genus has given it the name of *Antirrhinum* from words meaning like and snout. In a similar way, *Rhinanthus* means snout and flower, the name referring to the beaked upper lip of a species once included in the genus. *Dasystona* means hairy mouth and alludes to the hairs in the throat of the corolla *Pentstemon* is the name of a genus of plants with five stamens in a group where four in the fashion. The fifth stamen, however, does not bear pollen and the plants may therefore be considered in good standing in the family.

According to Wood, the foxglove genus,*Digitalis,* is from *digitabulum,* a thimble. Another derivation says it is from a word from fingers or "belonging to the fingers" as the common name suggests. *Schizanthus* is from two Greek words meaning cut and flower and was applied to this genus in

allusion to the laciniate petals. *Calceolaria* is from *calceolus,* a slipper, which the sachate lower petal suggests. *Leptandra,* by which a section of *Veronica* is sometimes known, means slender stamens, these organs being quite conspicuous in the plants so named. *Micranthemum* means, simply, small-flowered.

The genus *Veronica* is supposed to have been named for St. Veronica whose own name from *Vera icon* "true image" is connected with an interesting legend familiar to everybody. Whether the first Veronica was named because it bloomed on the day dedicated to the saint, or whether the plants, being medicinal, were under the protection of this saint, does not seem to be known.

Genera dedicated to less saintly personages are not uncommon in this family. *Seymeria* is for Henry Seymer an English naturalist, *Castilleja* is for the Spanish botanist Domingo Castillejo, *Buchnera* is for J. G. Buchner an early German botanist, *Collinsia* is for Zacheus Collins, an 18th century botanist of Philadelphia and *Schwalbea* is for C. G. Schwalbe an obscure German. The name *Gerardia* commemorates John Gerarde, the famous author of the "Great Herbal" issued about 1597, while *Pawlonia* is named for Anna Pawlona, a Russian princess, daughter of the Czar Paul I.

Peculiarities of the plants, other than the flowering parts have given names to such genera as *Linaria* where the reference is to the leaves like those of the flax (*Linum*). The mulleins have the very appropriate name of *Verbascum* which was originally *barbascum* from *barba* a beard. *Synthyris* is Greek for "doors closed" in allusion to the form of the seed capsule. *Orthocarpus* is the Latin for straight fruit and *Melampyrum* is Greek for "black wheat", the name said to have been given to these plants in allusion to the dark colored seeds of the species.

Two groups of little plants living in the mud have derived their generic names from their habitat. *Ilsanthes* is from *ilus*, mud, and *anthos*, a flower, while *Limosella* is from *limus*, mud, and a word for seat, the plants appearing as if sitting in the mud. *Herpestis*, a name formerly applied to a genus of plants now included in *Bacopa* is Greek for a creeper. *Bacopa* itself, is a South American word of unknown meaning and *Conobea*, the name given to a single small plant so inconspicuous as to have no common name, is from the same source.

The flowers of the Scrophulariaceae, like those of the Labiatae, are nearly all strongly two-lipped with shapes that often suggest the heads of animals as such common names as "turtle head", "snapdragon", "rabbit-flower" and the like attest. It is worthy of note, however, that one section of the family has flowers so nearly regular as to seem an anomaly in the group and one has difficulty in harmonizing such species with his conception of the family. Aside from the flowers, however, the other characters of these particular plants conform to the styles for the family and no botanist has yet had the hardihood to attempt their exclusion. Of this latter group, the mullein is an excellent example.

Everybody knows the mullein (*Verbascum thapsus*). The white-woolly leaves and tall, thick flowering-spikes are familiar sights in widely separated parts of the North Temperate Zone and have naturally gained the species many common names. More than forty of these are known. They are mostly of European origin, since the plant originated on the other side of the Atlantic, and the majority are of obvious derivation. Among the most numerous are those referring to the woolly leaves, such as "velvet-dock", "candle-wick mullein", "Adam's flannel", "felt-wort", "hare's beard", "flannel leaf", "old man's flannel", "blanket-leaf", "flannel plant",

"velvet-plant", "ice-leaf", and "lucernaria". The last mentioned is from the Latin *lucerna,* a lamp, and, like "candle-wick mullein", alludes to the ancient use of the woolly leaves as wicks for lamps. By many the word "mullein", or "mullen" as it may be spelled, is derived from the same root as wollen and the word flannel is regarded as akin to it. After the leaves, the flower-spike is probably responsible for the greatest number of names in the vernacular. Among these may be noted "Jacob's-staff", Aaron's rod", "hag-taper", "hedge taper", "torches" and "shepherd's club". The name of "cows lungwort" and "bullock's lungwort" may have been given to the plant in the supposition that it is medicine for cows, but grazing animals rarely if ever eat it. The plant is also called "great mullein" to distinguish it from the lesser members of its genus.

Verbascum blattaria is the "moth mullein". The name is said to have been given the plant because moths visit it, but it is very apparent that the hairy purplish stamens and the soft white or yellowish corollas make the flower itself very like a moth and this is probably the correct interpretation of the name. The specific term is from *Blatta* the generic name of the cockroch and was given this plant under the entirely erroneous impression that it will repel the unwelcome insects mentioned. The specific name of *Verbascum lychnitis* is from the Greek *lychnos,* a lamp, and is still another allusion to the use of mullein leaves as lamp-wicks.

A companion of the mullein in old fields, and like it an immigrant from Europe, is the "toad-flax" (*Linaria vulgaris*). This species, however, has a rather more aristocratic lineage and appears to have been first imported for the flower-garden, but its vagabond ways soon made its room better than its company and it was turned out and obliged to consort with other

weeds less beautiful. The name "ranstead", or "ransted", which colloquial speech has corrupted to "rancid" is the name of its introducer, and is all that is left to it of the days when it was held in high repute. The bright yellow and orange of its blossoms are responsible for many of its common names such as "butter-and-eggs", "eggs-and-bacon", and "bread-and-butter". "Rabit ears", "rabbit flower", and "snapdragon" refers to the shape of the flowers and "Jacob's ladder" to the form of the inflorescence. The slender leaves, much like those of the flax, have suggested "flax-weed", "toad flax" and "yellow toad-flax". At first glance it is a mystery how the toad became connected with this plant, but it is said on good authority that the plant was originally called *bubonium* because used in curing an affliction known as *buboes*. Since *Bufo* is the technical name of the toad the similarity of sound made the transfer easy. Entirely inexplicable are "bride-weed", "bride-wort", "impudent lawyer" and "gall-weed" though the last two suggest some points of similarity.

Linaria cymbalaria is the familiar creeping plant known as "Kenilworth ivy". It has a number of other names of similar meaning such as "coliseum ivy", "Oxford-weed", ivy-weed", "ivy-leaved toad-flax", "wandering Jew", "mother-of-thousands", and "climbing" or "roving sailor". The name of "pennywort" probably refers to the shape of the leaves but this term, like several others applied to it, are general terms used for many other plants. Both *L. spuria* and *L. elatine* are called "cancer-root" without adequate reason. These plants also bear the name of "female fluellin" which appears to be a corruption of a Welsh phrase meaning "Llewellyn's herbs or plants". The particular Llewellyn referred to, is the Welsh Prince mentioned in the legend of the hound, Gellert.

NOTE *and* COMMENT

STRENUOUS PLANT IMPORTATION.—Importers of plants have not always had the Federal Horticultural Board to contend with, but the introduction of new plants in America has sometimes failed to be plain sailing for all that. Take the case of the mango, for instance. The introducion of this fruit into Jamiaca was quite unintentional, so far as the original importers were concerned. In 1782, a French ship bound from Mauritius to Hayti with a cargo of economic plants was captured by the English under Rodney and sent as a prize to Jamaica. Among the plants were cinnamon, Jack-fruit (*Artocarpus integrifolia*) and mangoes (*Mangifera Indica*). The mangoes were invoiced by number and the names having been lost the plants were referred to by the original numbers. "Number 11" turned out to be an especially well-flavored fruit and to this day it has so influenced opinion that any superior variety is sure to be called a "number eleven". About ten years after this importation Captain Bligh landed in Jamaica with several hundred plants of bread-fruit (*Arctocarpus incisa*). The account of his adventures in securing these reads like a tale from the Arabian Nights. As Lieutenant Bligh, he left England in 1787 in command of the British ship *Bounty* for a trip to the Society Islands in quest of bread-fruit trees. He tried to sail around Cape Horn but hostile winds kept him back and he was obliged to make for Tahiti by way of the Cape of Good Hope. After taking on a cargo of a

thousand bread-fruit plants, he began the return voyage, but his sailors could not forget the beautiful Tahitians and about a month after sailing they mutinied. Bligh and eighteen of the men who had remained faithful to him were placed in an open boat and the ship sailed back to Tahiti where they took on a very different cargo and then sailed away again finally landing on Pitcairn Island in the Southern Pacific. In the meantime, Bligh and his party in the open boat made the trip of more than 4,000 miles across the Pacific and finally reached the Moluccas. Making his way to England, he was given command of a new ship and as Captain Bligh of the Ship *Providence* set out once more for Tahiti where he secured a new cargo and at last delivered it to its destination in Jamaica.

American Legion Daisy.—The American Legion has had the usual luck of those who attempt to adopt a representative flower that does not represent anything in particular. In the beginning the poppy of Flanders was most appropriately chosen, but later it was rejected because it was not a native American and because it was feared that it might become a weed if introduced into this country. As to the last mentioned objection, it may be said that the poppy has been cultivated for many years on this side without showing a tendency to spread from the garden. At the Legion's third national convention the "American Daisy" was adopted. Those who sponsored the claims of the daisy were careful to point out that the flower designated is not the daisy of Burns and Shakespeare, but their botanical knowledge, was apparently not extensive enough to apprise them of the fact that the "American" daisy is by origin an English plant, that it is a noxious weed in any country, and is detested by every cultivator of the soil. The sentimental may dignify it with the name of "Marguerite," but the farmer calls it plain "white-weed".

White Pine Blister Rust.—The white pine blister rust (*Cronartium ribicola*) is a European fungus pest that became established in New England about twenty years ago. It is very destructive to the white pine (*Pinus strobus*) as well as to other pines with five needles in a bundle. It was hoped that it might be kept out of the West and Northwest where there are still extensive forests of western white pine (*P. monticcla*) and sugar pine (*P. Lambertiana*), both susceptible species, but it has recently found a foothold in western British Columbia and Washington. When a pine tree is attacked, the fungus does not spread from it directly to other pines, but must first pass a certain stage of its life on the leaves of some species of currant or gooseberry. In making war on the pest, therefore, an attempt will be made to eradicate the species that transmit the disease to the pines, but since these shrubs are very numerous in the Northwest a long and strenuous contest is in prospect.

A Weedless Lawn.—Those who dislike the annual labor of eradicating from the lawn dandelions, quack-grass, purslane, dock, and other interlopers, will be interested in a new method of lawn-making that obviates this performance. The idea originated at the Agricultural Experiment Station of the Rhode Island States College at Kingston, at least they have been able to maintain what amounts to a weedless lawn there for more than fifteen years. In an Extension Bulletin (No. 13) they tell us how it is done. It all goes back to the subject of acid and alkaline soils. It happens that the weedier the lawn, the likelier the soil is to be alkaline, or to turn the statement around, if you have an alkaline soil you are likely to have weeds. The weeds have so long fought the crops of alkaline soils that they have decided aversion to soils that are sour, but certain grasses have no objection to acidity and thus

we circumvent the weeds by making the soil sour and planting the grasses. All that is then needed is to keep the soil at a proper degree of acidity. The grasses recommended for such lawns are Rhode Island bent, creeping bent, velvet bent, red-top and Italian rye-grass. Most of these grasses are species of *Agrostis*, the first named being the most highly recommended. To produce the proper degree of acidity the soil is treated before planting with equal parts of ammonium sulphate, acid phosphate and muriate of potash, applied at the rate of about 3 ounces to the square foot or about 750 pounds to the acre. All lime should be avoided and clover, of course, will not grow in such soils. To keep the lawn in condition and prevent the weeds from pushing in, the same amount of fertilizer must be applied annually, early in spring, but most gardeners will regard this as worth the trouble. It is well to remember, however, that ordinary garden plants are not likely to thrive in such soil.

Gardening in Acid Soils.—By this time it is probably pretty well known that the heaths, pitcher plants, orchids and the like that are commonly regarded as difficult to grow, are difficult only because they dislike alkaline soils. If the soil is made acid, they thrive without much care. Since there are an immense number of plants in the world that favor acid soils, and many of them produce most beautiful flowers, the problem of their cultivation is an important one. Dr. Bird has recently shown in these pages that artificial bogs for the cultivation of such plants may be made by simply watering the plants with a solution of tannic acid. Now F. V. Coville, a Government botanist has devised another scheme to make the soil acid, not so much by adding acid as by taking out the alkaline matter. By adding aluminum sulphate to the soil, the sulphur forms a new combination with the lime in it mak-

ing calcium sulphate which is thus rapidly leached out of the soil. In one case reported, rhododendrons treated with aluminum sulphate increased in size 250% more than untreated plants. If as encouraging results are obtained with other acid soil plants, we may expect our blueberries to attain unheard-of size and luxuriance, and trailing arbutus and the orchids to become a feature of all good gardens.

Where Snow Falls Deepest.—The greatest snowfall known in the United States occurs in the Sierra Nevada and Cascade Mountain ranges in the Pacific Coast States, where at some places from 30 to more than 40 feet of snow falls during the winter season, says the Weather Bureau of the United States Department of Agriculture. At Summit Calif., which has an elevation of about 7,000 feet, nearly 60 feet of snow have been recorded in a single season, and about 25 feet in a single month. Snow usually falls on more than 60 days of the year in northern New York, the upper peninsula of Michigan, northern Minnesota, and northern North Dakota, as well as in the higher elevations of the northern Rocky Mountains. Snow may be expected on as many as 30 days as far south as southeastern Pennsylvania, central Ohio, southern Wisconsin, and southern South Dakota, and on 10 days in southern Virginia, western North Carolina, the northern portions of Tennessee and Arkansas, central Oklahoma, and northwestern Texas. In extreme southern South Carolina, south-central Georgia, northern Alabama, and south central Texas, however, snow may be expected only on about one day during the winter.

Speed of Birds in Flight.—Certain species of hawks have a speed of 200 feet a second, or about 136 miles an hour, according to the U. S. Biological Survey. This might be a suitable rate for a racing airplane. The canvasback duck can

fly from 130 to 160 feet a second, but its usual rate of 60 to 70 miles an hour would be pretty fast to be enjoyable in a plane making a pleasure trip. The crow is the least rapid of a list of 22 migratory birds, flying an insignificant average of 45 feet a second, or 30 miles and hour. Of course this speed maintained steadily in an automobile would mean a very fair rate of progress, defying the speed laws in many communities. Most of the birds listed, however, do better than the crow. Curlews and jacksnipes can fly 55 and 65 feet a second, while quail, prairie chickens, and ruffed grouse can make 75 feet. The dove can reach a speed of 100 feet a second, or 68 miles an hour, although its usual rate is less. Redheads, blue-winged teals, green-winged teals, Canada geese, and different varieties of brant can fly over 100 feet per second, ranging in speed from 68 to 98 miles an hour, but usually fly at a much slower rate.

Plants and Ultra-violet Light.—An interesting series of experiments on the effect of ultra-violet light on plant life is being conducted at the Pennsylvania State College. It is reported that H. W. Popp, an instructor, has found, in preliminary tests, indications that the invisible rays in sunlight decrease the rate and amount of germination in soaked seeds, inhibit growth and development, and finally cause the death of the plants. In some varieties of plants, it was found that new leaves would not form under ultra-violet light, and in other cases it was found that, though the leaves formed, they were killed a day or two later. The ultra-violet light was produced by means of a mercury vapor arc. Various types of screens were used to eliminate the ultra-violet light from sunlight.

Mahonia Repens not Guilty.—Another proof of Josh Billing's famous aphorism that "It is better to know less than

to know so much that aint so" is supplied by *Mahonia repens* which, because of its alliance with the barberries, was ostracised, some years ago, when certain young scientists were making a reputation by making war on the barberries. In some sections the common barberry (*Berberis vulgaris*) is a well-known carrier of one stage of a rust that is very destructive to wheat. In consequence it was decided to eradicate all barberries, whether in city or country. *Mahonia repens*, often called *Berberis repens*, naturally fell under the ban but the Federal Horticultural Board has now graciously permitted it to live and has pronounced it not guilty of harboring the rust. The unfortunate part of the affair is that this belated reinstatement will not bring back the plants dug up in a patriotic effort to help the Government stamp out a plant parasite that does not require the barberry in is young life but nevertheless lives on it when it gets the chance.

Marsh Elder and Sunflowers.—I want to supplement my statements about *Iva Xanthifolia*. Never anywhere have I seen any weed spread and develop as this one has in Pocatello. Three years ago it could hardly be found and the few individuals that were hidden in out of the way nooks were so small and stunted as to be hardly recognizable. Last summer it was everywhere, especially abundant along the sidewalks and curbings of the vcant lots in the business district. While the great majority of the plants were still far below the height of this plant in the mddle west, here and there one more lusty than its fellows, attained a height of five or six feet with large and heavy panicle that promises much for the future possession of the land. Where this weed grows abundantly Russian thistle and our native saltbush occur very sparingly but it will require further observation to determine whether it is supplanting them or only occupying

the territory they have not covered. It still sticks to the soil around town but I have seen a few small plants here and there along trails and streams in the hills that indicate its scouting activities. Sunflowers, too, are spreading so rapidly here that Kansas will have to go to planting sunflowers to keep up with us. Not only along ditch-banks, curbings and railroad tracks but everywhere in waste ground along the river, in dry-farmed fields, unbroken gulches and gravelly benches the ground is hidden by a blaze of yellow. There are two species of them *Helianthus lenticularis* and *H. aridus*. Generally speaking the former prefers the improved soil about town while the latter is more abundant on the raw soil of the hills but the two often grow together. Is this a hint from Nature as to the developement of a new product from our semi-arid tracts? "The old Oregon Trail across the prairies died in a blaze of sunflowers" but it has been born again west of the mountains, flanked with golden glory typical, not only of the lure that called the white man across their savage summits, but also of the wealth that is waiting for the application of work and wisdom—*Mrs M. E. Soth, Pocatello, Idaho.*

Owners of Complete Sets.—To the list of owners of complete sets of this magazine, may now be added the following:

65. Daniel Smiley, Mohonk Lake, N. Y.
66. University of California, Berkeley, Calif.
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68 Wm. H. Lightfoote, Canandaigua, N. Y.

There are still left sets 69 to 90. Set 91 is owned by the editor and this completes the list. We have seven additional sets of Vols. 1 to 22 inclusive which can be used to complete sets of those whose subscriptions began as early as 1917 but

this is the absolute limit. Prices will naturally advance as our stock approaches the vanishing point. Those who contemplate owning a complete set should hesitate no longer.

Chinese Potato.—Those who patronize chop-suey establishments may have become acquinted with a curious vegetable known as Telinga potato or Chinese potato. It is not a potato nor closely related to the potato family, but it is nevertheless a very palatable vegetable, either raw or cooked. Examination of fresh specimens show them to be corms an inch or two in diameter that are produced by an araceous plant known as *Candarum potato*. The plant is cultivated in Eastern Asia and the fresh corms have a taste somewhat like chestnuts. In flavor they are much superior to the dasheen, another corm produced by a tropical species of Araceae.

Bread from Tears.—A species of grass often cultivated in old gardens for its hard grayish seeds is commonly known as Job's tears (*Coix lachryma-Jobi*). The seeds are frequently made into necklaces and have the special merit for this purpose of being perforated and ready to string. Nobody would think of using these hard bony objects for food, but a variety has been discovered in the Philippines in which the outer husk is so thin as to be easily milled and then can be made into flour from which a very palatable bread can be baked. The plant has yielded thirty bushels or more to the acre and can be profitably grown wherever rice can. It promises to be a valuable addition to the cereal crops of the warmer parts of the world. It is already used to some extent in the Philippines and is being introduced to new countries under the Phillippine name of *Adlay*.

Edible Morning-glories.—Although the sweet potato belongs to the morning-glory family, one does not commonly think of the family as a producer of edible species. A plant

recently sent from China by one of our Government's agricultural explorers, however, is recommended as a pot-herb the leaves and young stems being the parts used. The plant is semi-aquatic and the leaves that appear in market are gathered from plants grown on the borders of wet fields. It is reported that during June and July, loads of the young shoots are sent to market. The stems are about 18 inches long, hollow, and half an inch in diameter. These with the succulent leaves are cut up into a spinach-like food.

Rattlesnake Plantain Colonies.—It seems to be a rare thing for the little orchid known as rattlesnake plantain (*Goodyera pubescens*) to grow singly. Almost invariably they occur in close little colonies very conspicuous by reason of their white-veined and mottled leaves. The reason for these plants growing in companies seems to be that the young plants find the best conditions for growth near to the old plants and thus continue to renew or extend the original colony. This is quite contrary to the behavior of plants in general, for the seedlings seem to desire to get as far away from their place of origin as possible. In the orchid genus, however, the young plants have set up a partnership with a mycorrhizal fungus and are not able to thrive without it. In consequence they seldom find suitable places for growth at any great distance from the parent colony. The seeds of *Goodyera pubescens* lie on the soil all winter and sprout the following spring, but by the end of August they are often only a millimeter in length and lack chlorophyll, according to Oakes Ames, from whose article in *Rhodora*, we quote. The protocorms, as these small bodies are called, develop numerous long, slender, root-like processes known as rhizoids and then appear "like small white spiders at the center of miniature webs." The fungus enters the rhizoids and aids the young plant in making food by absorbing useful

material from the humus in the soil. At the beginning of the second spring, leaves and roots are produced and the young plant proceeds to grow up.

Quince Fruits.—It is seldom that the descriptions of the technical botanist make a vivid impression on the mind. One would not recognize his best friend if described in the same way. When one has a plant in hand, it is very convenient to compare it, point by point, with the technical description, but for ordinary purposes this is not sufficient. Who that has read the description of the Japan quince, realizes that the fruits are five-angled like the well-known "delicious" apple, or that the core is much more roomy than that of the largest apples and fairly packed with seeds? It is a matter of common knowledge that the apple-like fruits consist partly of the ripened ovary and partly of the floral receptacle, now grown thick and juicy. In most pomes, as these fruits are called, one may distinguish in a general way between the receptacle and ovary, but in the Japan quince there is no doubt about it. When cooked, as in the process of making jelly, the receptacle comes apart along the five angles and spreads out like some new kind of flower in which the five divisions form the corolla with the ovary in the center. In size and shape they suggest the larger forms of earth-stars (*Geaster*). The core or ovary when ripe is quite firm and woody and very clearly indicates its relation to seed capsules in general.

Sweeter than Sugar.—Under the title of this paragraph there was published in this magazine several years ago, a note on a South American plant whose leaves placed in the mouth gave the impression that they were much sweeter than sugar. The plant was formerly called *Eupatorium rebaudianum* but it is now sometimes placed in the closely allied genus *Stevia*. The principle that causes the sweet taste has been

found to be a glucoside and therefore not likely to compete with sugar in the markets of the world. The behavior of this plant, however is quite put into the shade by a member of the Sapotaceae named *Synsepalum dulciferum* from tropical Africa. This species has berry-like fruits resembling olives, which at maturity are dull red with a thin soft pulp. When this fruit is eaten it has the property of making even the most acid substances taste sweet and this peculiar effect is said to last for an entire day.

Back Numbers Wanted.—Walter M. Buswell, Fort Myers, Fla., needs No. 2 of Vol. 25 and No. 2 of Vol. 27 to complete his set of this magazine and will pay cash, or exchange complete volumes for them. The Buffalo Society of Natural History, Public Library, Buffalo, N. Y., also wants No. 2 of Vol. 27. Mr. Madison Cooper, Calcium, N. Y., wants all of Volume 23 and offers any reasonable price for the numbers. Readers who happen to have extra copies of the numbers wanted will do a great favor by communicating with the persons mentioned. If there are any others who still need odd numbers to complete their files they should speak at once. It will soon be too late.

EDITORIAL

One of the things that is the matter with botany is the Academic Mind. An individual laboring under this handicap would much prefer data on the structure of fibro-vascular bundles, the nature of the nuclear spindle, the position of the chromosomes in karyokinesis, and the chemical composition of the anthocyanins than to have the run of the finest garden or park in the world. It is the academic mind that inclined botany teachers to require their classes to draw cross-sections of a pickled seaweed conceptacle with the aid of the compound microscope, when they might be observing the vegetation of field and wood or studying the insects that pollinate the flowers. The teacher with the academic mind does not subscribe to the botanical journals. He does not have to keep up with the advances in botany. His courses in plant study were cut and dried, especially dried, long ago and he means to keep them in that condition. But all this reacts unfavorably upon the flower-loving public which contributes the money for the upkeep of the schools and wants its children taught something about plants that they can use. Such questions as "What is the name of this plant?' "What is it good for?" How can you grow it?" Where does it grow?" "How can you multiply it?" "To what other plants is it related?" "Is it helpful or harmful?" are all too rarely heard in the school room. We know of at least one high school in a large city where agriculture is taught out of a book. Just imagine asking an able-bodied boy aching to get out into the soil on a spring day to stand up in class and describe plowing from the description

in the book! And think of the botany teacher who does not know the common plants of his own region and who never possessed a garden of his own! How can he teach botany of any significance? Is it any wonder that botany is slipping? What can we expect so long as the Academic Mind is in control; when the teacher of botany, rather than the botanist makes the course of study?

BOOKS AND WRITERS

Well, we suppose we shall have to mention the Editor's new book first. * * * "American Plant Names" is the title though it covers only the plants of North-eastern America. * * * Three parts have been issued and another is nearly ready. * * * There are about six thousand names in the first hundred pages. * * * It is a German sort of a book in which the author records the facts, whether they mean anything or not. * * * But it will be invaluable for reference, the Editor says. * * * Now that is off our mind. * * * Looks as if the new year would be a good one for botany, so many new magazines are springing up, or about to spring. * * * The most ambitious undertaking is the 64-page *Nature Magazine* announced from Washington. * * * You probably received a copy of the prospectus. * * * Yes, everybody did! * * * The *National Horticultural Magazine* has already issued two or three numbers. * * * Hamilton Traub, secretary of the National Horticulture Society is editor. * * * The society wants more members. * * * Its office is at Henning Minn. * * * We hear that Eva Kenworthy Gray is publishing the *Flower Journal*. * * * Two numbers are reported to be out but we have not seen them. * * * All this activity

is good for botany. * * * We need more magazines and more botanists. * * * Something ought to be done about it! * * * Luther Burbank writes to one of our contemporaries that "I know of no other horticulture magazine published anywhere that is so well edited and so generally interesting." * * * Bless your heart, Luther, you are going to see one just as soon as this is off the press! * * * "Every day and in every way we are getting better and better." * * * C. A. Weatherby says that somebody has been pirating the *Fern Bulletin.* * * * A reprint of Vol. 1. No. 1, has been discovered. * * * If anybody knows who did it, we wish they would let us know too. * * * No we don't intend to reprove him. * * * We think just as much of the *Fern Bulletin* as he does. * * * Wish he would reprint several other numbers. * * * They are as scarce as cardinal flowers in January. * * * That reminds us that the Editor is going to bring out a new edition of his "Fern Allies of North America." * * * This is positively its last appearance, * * * The plates are to be melted up. * * * Get ready to order your copy. * * * R. C. Benedict says there ought to be game laws for ferns and rare flowering plants. * * * His observations on the subject, reprinted from *American Fern Journal,* are being distributed by the Brooklyn Botanic Garden and the Fern Society. * * * Vermont has protected her territory from the hand of the spoiler by enacting a law to prohibit picking flowers and uprooting plants. * * * Other States are expected to follow this example. * * * The subject of Dr. L. H. Bailey's second number of "Gentes Herbarium" might well be "Too Much Mustard!" * * * In a scholarly paper he has tried to separate the cultivated forms of *Brassica* or *Sinapis* or whatever else you may call them.

* * * Think of all the varieties of cabbage, kale, broccoli cauliflower, collards and brussels sprouts belonging to a single species! * * * And the kohl-rabi and turnip almost squeezed in! * * * Pe Tsai, the so-called "celery cabbage" is identified as *Brassica pekineisis*. * * * After this the mustards will stay on their own side of the fence. * * * Dr. Aven Nelson has resumed his position as head of botany in the University of Wyoming after serving five years as President of the institution. * * * The West is fond of making University presidents out of its botanists; Dr. Bessey served in this capacity in the University of Nebraska. * * * We like to see eminent scientists at the head of large institutions but good botanists are too rare to be used as mere college presidents. * * * We are glad to see Dr. Nelson back in his old position. * * * The botany of the Rocky Mountain region will now get a new impetus. * * * In appreciation of his services, Dr. Nelson was given a three month's leave of absence. * * * He is spending this in California. * * * "Pettiford's fern" illustrated in the *American Botanist* for last August was awarded a silver medal at the 94th annual show of the Pennsylvania Horticultural Society. * * * It is *Aspidium lasercpetifolium* from Asia. * * * But no longer a foreigner; it has been naturalized near Philadelphia. * * * The *Independent Gazette* of Germantown reprinted the article from this journal. * * * W. R. Maxon sends us a copy of his "Botanical Gardens of Jamaica". * * * It is reprinted from the "Smithsonian Report" for 1920. * * * Well, we have been in all of them and they are just as he says they are. * * * Twenty fine plates accompany the text. * * * Makes one want to explore the Blue Mountains again. * * * *Hinc illae lachrymae.*

The long-expected "Fern Lovers Companion" by George Henry Tilton has at last appeared. It is a fine little book of some 238 pages in which are treated all the ferns of that region commonly known as the Northeastern States but which by common consent for floral purposes goes west to the Great Plains and South to the mountains of Kentucky and Tennessee. The book is very well printed and fully illustrated the illustrations for the most part being from ferns in the author's collection, but other sources have been drawn upon, such as the Davenport Herbarium and various fern-books now out of print. The ferns are discused in related groups the text devoting two paragraphs to each species, the first of a technical nature and the second more popular. There is a list of American and foreign fern literature, a glossary, a list of the species discused with their synonomy, and directions for studying ferns. The book is a most attractive addition to our fast disappearing fern literature and will undoubtedly meet with a warm welcome from students of ferns. It is published by the author at Melrose, Mass.

At first thought it might be hastily assumed that all the different kinds of garden-books have been written, but Ella M. Freeman has shown otherwise in her "Home Vegetable Garden.". If one who knows all about gardening should walk about her grounds and comment on each kind of vegetable as she came to it, and later set all this down in a book it would probably be very much like the one before us. It is no made-to-order volume; the author undoubtedly wrote it for the sheer delight of telling about her plants. The book is full of information from cover to cover, but it is not of the seed-catalog variety. It reads a good deal more like an essay. In spite of this, or because of it, each vegetable is thoroughly discussed from seed-sowing to the table or the storage-cellar.

Anybody who enjoys a good garden will be pleased with this book. It is number 2 of a new "Open Country Series" under the editorship of L. H. Bailey who has himself written the initial volume on "The Apple-tree." Two other volumes, "The Cow" and "Vacation on the Trail" have also appeared. The price of the present volume is $1.75.

Along the western side of India, south of the tropic of Capricorn, there is a stretch of country known as the Bombay Presidency, whose ferns form the subject of an attractive little volume by E. Blatter and J. F. d'Almeida, professors of botany in St. Xavier's College, Bombay. "The Ferns of Bombay" is a book designed to advance the study of the ferns in the Presidency by providing means for their identification. In the beginning, the terms used in describing ferns are defined, and the distribution of the different species discussed. The bulk of the book, more than 200 pages, is devoted to technical descriptions of the species. There is a synopsis of the genera and various keys to the species, but this feature is not as conspicuous as it might be. Owing to the great diversity of surface, the rainfall of Bombay is very uneven. Some portions are so arid as to approach desert conditions, while others are moist enough to support an evergreen rain-forest. There are however, fewer than a hundred species of ferns known. In spite of the great distance that separates us from Bombay, we note a number of familiar species in its flora. Among these are the bracken (*Pteris aquilina*), the lady fern (*Asplenium filix-foemina*), the adders tongue (*Ophioglossum vulgare*), the rattlesnake fern (*Botrychium Virginianum*), the venus'-hair fern (*Adiantum capillus-veneris*), the royal fern (*Osmunda regalis*), the marsh fern (*Nephrodium thelypteris*), and the holly fern (*Polystichum aculeatum*). Many others are common in the American tropics including *Pteris*

longifolia, *Adiantum tenerum*, *Blechnum occidentale*, *Nephrodium molle* and *Acrosticum aureum*. The well-known *Gymnogramme calamelanos* has become naturalized in Bombay. The book is well illustrated and well printed. It is issued by D. B. Taraporevala Sons & Co., Bombay, and costs 7 Rupees and 8 Annas.

In early April, the first flowers to greet the searching eyes were those of the Anemone hepatica or liver-leaf, which blooming at Easter were once named *Paas-blumtje*. Cousin-german to the European pasque flower, it is, with its evergreen leaves and persistent vitality, a better symbol of the resurrection, and more perhaps than any other of our wildflowers gives the welcome sense of quickened life in the woods and fields. Nestled among the branching roots of a great tree, or in the crevices of a rock, from among the cluster of last year's leaves —three lobed leaves of an ivy-green and purplish crimson underneath—rise a dozen slender stems wrapped in silken hairs; and from the furry involucre delicate in texture and tint as the silvery-tipped paws of a Maltese kitten, open to meet the sunshine glad flowers of every shade from hyacinthine purple to the windflower's rose-flushed pallor. Their fragrance is a subtile aroma distilled in the waiting buds by the first warm breezes and tells of fresh running sap, of bursting leafbuds and swaying catkins. It is the breath of the April days; Nature has awakened; the Lord is risen!—MARTHA B. FLINT.

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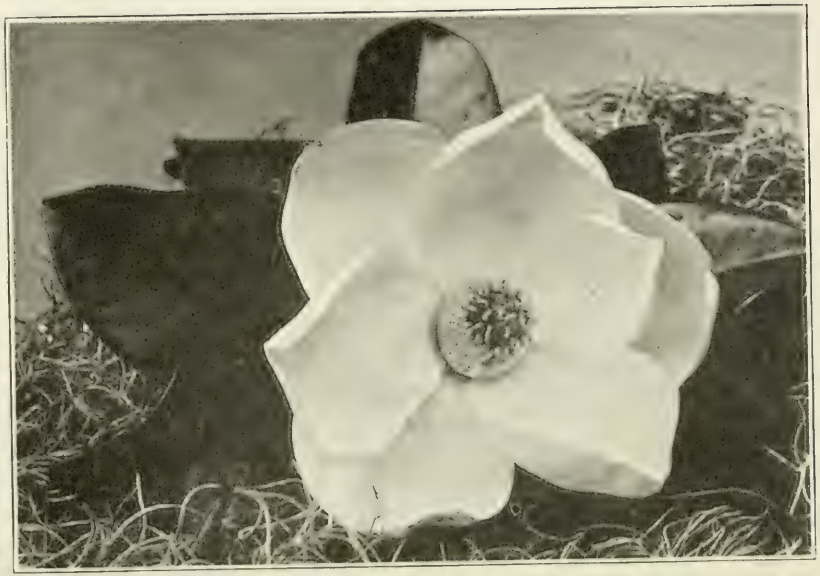

MAGNOLIA GRANDIFLORA

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THE AMERICAN BOTANIST

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Skirting the rocks at the forest's edge
With a running flame from ledge to ledge,
Or swaying deeper in shadowy glooms,
A smouldering fire in her dusky blooms;
Bronzed and molded by wind and sun
Maddening, gladdening every one
With gipsy beauty full and fine,
Gracefully blossoms the columbine.

THE FLOWERS OF THE MAGNOLIA

By WILLARD N. CLUTE

IT is well known that not only plant families but lesser groups are based largely upon the structure of the flower. We are quite accustomed to refer plants with lilylike flowers to the Liliaceae, those with roselike flowers to the Rosaceae, and so on, but we run some risk of overlooking the fact that there are other features of the flower that are quite as characteristic and striking. Take size, for instance. There seems to be no reason why different species in the same family should keep within definite limits as to size and yet there are whole plant groups that are distinguished almost as much by the size of the flowers as by any other feature. The Umbelliferae almost without exception have very small flowers that are conspicuous only because massed and the flowers of Cruciferae, though much larger are still so small that taken singly few are noted for their beauty.

It is quite otherwise with that great alliance known to the botanist as the Ranales. Besides the Ranunculaceae, or buttercup family, for which it is named, it includes the Anonaceae or custard apples, the Nymphaeaceae or water-lilies, the Magnoliaceae and various other groups noted for the size of individual blossoms. We have only to call to mind the peony, pawpaw, May-apple, clematis and water-lily, to realize this; in fact, with few exceptions, the largest flowers in the world are found in this group. The blossoms of the Amazon water-lily (*Victoria regia*) are often more than twelve inches in diameter and even in our own part of the world the yellow nelumbo may reach the size of a quart bowl. The magnolias which, in the Western Hemisphere occupy the region between the plants just mentioned, have flowers quite in keeping with theirs. The flowers of the more hardy northern species often approach those of nelumbo in size while *Magnolia grandiflora* of the South, the species which always comes first to mind when magnolias are mentioned, occasionally reaches the dimensions of the great water-lily itself.

Magnolia blossoms however, have other claims to our attention, besides those of mere size. They are among the most beautiful of single flowers with thick, waxy, petals that form a substantial cup from which a pleasing perfume is poured. The structure of the flower is also of interest. Among other things it shows the magnolia family to be pretty well down in the list as plant relationships go. Indeed, certain characteristics, such as the stamens and carpels arranged in spirals instead of cycles, suggest a derivation from some pine-like ancestor. The petals and sepals also fail to conform to the standards set for higher types of flowers and seem quite undecided as to their affinities. Instead of adopting the five-parted arrangement characteristic of dicotyledons,

they show a tendency toward the monocotyledon number of three. By many this is taken as evidence of the relationship of the magnolias to the monocotyledons and to indicate that the latter group may have taken its origin from this section of the plant world. In fact, the water-lilies, which have similar characteristics, are often considered true monocotyledons.

The ripened ovaries of the magnolias cling together in oblong masses much like cones in appearance and again suggest a relationship to the pines. To others the fruits have suggested young cucumbers and several species are called cucumber trees on this account. The carpels at maturity open and disclose one or two seeds covered with brilliant scarlet arils, much like the fruits of the bittersweet (*Celastrus*). Unlike the bittersweet, however, the seeds when they leave the carpels, do not immediately fall to the ground, but hang for some days suspended by short silken threads which appear to be a part of the seed-stalk. Thus embellished the cones of fruit take on a new beauty.

The illustration for our frontispiece was made from a photograph of a flower of *Magnolia grandiflora* taken in Florida by Mr. Walter M. Buswell, of Fort Myers and kindly loaned for the purpose.

FLORA OF POCATELLO, IDAHO [1]

By Blanche H. Soth.

POCATELLO, Idaho, is situated almost at the mouth of the valley where the Port Neuf river emerges from the hills on its way to the Snake. The higher hills about the town are the northernmost bluffs and outposts of the Wahsatch range—among the oldest elevations of land on the continent. Briefly and very generally, three geological periods are recorded by (1) the mature hills west of town of which Kimport Peak is the highest point overlooking the valley, (2) the nearly level benchland in front of them and a hundred feet or more above the present level of the river and (3), due to a comparatively recent elevation, the cutting of the face of the bench into a series of shallow gulches and a few deeper narrow canyons. During the period of subsidence at the end of the glacial epoch an arm of great Salt Lake drained by way of Red Rock Pass through the Port Neuf valley into the Snake river. At that time huge deposits of sand, gravel and clay were dumped into the valley. The lower sand hills east of town are of this heterogeneous material. No doubt with them were carried the roots and seeds of the desert plants which today grow upon them but whose center of distribution is much farther to the south.

On the west, Mink Creek, City Creek and Trail Creek come down from the hills through narrow canyons which they have cut across the bench. Several miles south, Rabbit Creek comes into the valley from the older broken country to the southeast. Pocatello Creek meanders about the east-

ern base of the sand hills east of town until it sinks away in the loose deposits. Spring Creek and Michaud Creek are farther to the northwest, the fish hatchery is near the mouth of the former. Mt. Putnam some fifteen miles northeast is a point of interest much frequented. The hills west of town have a rich and varied flora due to their older, richer soil and their protection from the drying chilling southwest wind which sweeps the inter-mountain country so constantly. The sand hills east of town exhibit many patches of desert vegetation characterized by some species not recorded from any other point so far north but nowhere upon them are there any great number of species. The native flora along the river has been almost obliterated especially within the city limits. Necessary embankments have destroyed much of it, other places, subject to yearly overflow, have filled up with a great variety of introduced weeds which are rapidly spreading and crowding out the native plants even in those areas which have not been disturbed.

Pocatello has an altitude of 4,500 feet while Kimport Peak is approximately 7,000 feet above sea level. The flora of the valley as a whole is Transitional. Patches of pure Sonoran (upper) vegetation occur on the sand hills. The Canadian zone appears toward the summits of the higher hills and extends well down in places along the creeks and in the deeper moister gulches. The flora of this part of Idaho is closely related to that of the Wahsatch region, many of the desert species probably having been carried here in the manner above indicated, while the great Snake River valley has always acted as a barrier to the migration of plants from the north.

The rapidity with which introduced weeds are crowding out the native flora is worthy of note. *Bromus tectorum*

has almost entirely replaced the native bunch grasses. Extensive patches of *Salsola pestifer* in late September give a characteristic ruddy glow that alternates with the blaze of rabbit-brush (*Chrysothamnus*) up and down the slopes of the entire valley. It is remarkable how many weeds from the Old World are spreading here and how few of the native plants resist intrusion and become weeds. Among the most striking examples of the former are *Lepidium perfoliatum, Cheirinia repanda* and *Atriplex laciniata,* this last not recorded from any other place in the United States. The planting of European sugar beet and grain seed in many places west of the mountains easily accounts for the presence of the first two while the last seems to be closely connected with the large European population of Pocatello.

The seasonal aspects may be divided into pre-vernal vernal early aestival, late aestival and autumnal.

The pre-vernal aspect covers the time from the beginning of plant growth to about the end of April. During this period the grass becomes green, the buds of the trees swell and burst, and pussy-willows, and such other tree blossoms as appear before the leaves, expand. Buds and young shoots of *Artemisia* and *Chrysothamnus* soften and afford good browsing for hungry herds. The bristly points of *Phlox* and other pungent -leaved perennials become tender. Basal rosettes of such plants as *Arabis, Senecio,* and *Cheirinia* are conspicuous and succulent tufts of larkspur as well as the tender green shoots of poison sego offer dangerous temptations to hungry animals. A very few herbs flower at this season. (*Frittilaria pudica, Phellopterus Utahensis, Cogswellia Jonesii* and *Microsteris micrantha*). The last mentioned is the earliest. I have found it in bloom March seventeenth on the grassy slopes below the cedars when scarcely an inch high.

A copious shower or two about this time will usher in the vernal aspect which covers the month of May. Moisture rather than temperature determines this aspect. If rain falls a host of perennial desert herbs come quickly into bloom upon the sand hills and the gravelly slopes and gulches of the bench-land. Among the first to bloom are lungwort *Mertensia lanceolata* and *Astragalus purshii*. Shrubs like golden currant (*Ribes aureum*) and service-berry (*Amelanchier florida*) bloom at this season and add their fragrance to the color of the lower forms. This aspect is the glory of the year for the lower hills but the gulches higher up about Kimport peak are still burdened with deep accumulations of snow. However, if the rain fails the flowers are fewer and less conspicuous, many plants fail to bloom at all or are delayed far beyond their usual season. Some will even bloom in autumn if rain follows an unusually dry spring. Always these early flowers mature quickly and the above ground parts disappear before the true summer flora of the higher hills appears.

The month of June approximates the early aestival aspect. It is the "high tide of the year" for the valley as a whole. The snow banks upon the higher hills melt rapidly and every little depression cradles a rippling streamlet. Some of this water finds its way into the creeks, filling them to overflowing and their banks and meadows teem with life and color. Much more of this water, however, sinks into the loose, gravelly soil to reappear further down in springs or at least in available moisture that nourishes groves of maple and dense, extensive beds of flowers. Trees are in full leaf. Some flowers of the vernal aspect persist in sheltered gulches and large numbers of seedlings come into bloom. Purple mists of *Pentstemon* drift away like smoke from the blaze of great patches of *Helianthella*. Closer examination shows that these natural gar-

dens support a dense growth of *Eriogonum, Yarrow, Geranium, Erigeron* and *Balsamorrhiza* with wild rose and dogwood along the creeks, sego stars in the sagebrush, pink buttercups and balm among the rocks on the summits. Why care whether corn and cabbages are growing in the town?

By the fourth of July the ruddy sheen of the ripened June grass has replaced the floral display upon the lower slopes of the valley and proclaimed the advent of the late aestival period. The available moisture of the soil has disappeared. It is hot, arid and dusty. Dense growths of pestiferous weeds are beginning to excite the maledictions of property owners and sufferers from hay fever. But plants as well as men find agreeable haunts in the high wooded hollows along the headwaters of the creeks. Fragrant mint and yarrow, the sweet blue eyes of grass and speedwell, and flames of monkey-flower and painted tip are in the meadows. Ragwort and monk's-hood strive to overtop the shrubs. Currants, chokecherries and service-berries hang ripe for the taking. Apparently this is the end of the floral year. But by the middle of August sunflowers are everywhere in great patches and in long golden trails in every direction. The grasses are sere and brown but the green clumps of rabbit-brush and greasewood and the gray blur of the various kinds of "sage" are becoming increasingly conspicuous. Water in the reservoirs and ditches is getting dangerously low. We are praying for rain.

At last it comes and with it the autumn blaze, the halcyon time of all the year for all the great dry lands of the west. The torchweed's glow gilds all the gulches. Great fields of rabbit-brush afire with bloom stretch endlessly with here and there amongst them the ruddy embers of patches of Russian thistle. Crimson tongues of maple on the hillsides, spurts of

cotton-wood blaze on the creek banks, smoky sheen of sage and shad-scales on the flats, desert haze in the distance but desert sunshine all around, the coming winter has no power to chill until the last faint glow of this autumn fire has flickered out in late November.

BOTANY FOR BEGINNERS—VI

By Willard N. Clute

IN that part of America which lies north of the Ohio River and east of the Mississippi there are about four thousand different kinds of flowering plants and incidentally most of the botanists. Owing to the greatly diversified surface of the region the plant population varies with the locality, each species thriving in the situations best suited to its needs and being rare or absent altogether in less hospitable places. Moreover, there are other differences in the flora that may be ascribed to the effects of migration. Prairie species push in from the west, southern species crowd up along the Atlantic coast and plants from the north invade the mountain summits. Why the botanists are most numerous in this region has never been settled, but the fact that they are here most abundant certainly accounts for the fact that a majority of the books on plants issued address themselves to this audience.

A few plants are so tolerant of differences in soil and climate that they have a range almost as wide as the region, but with the exception of these the flora of one place is likely to differ considerably from that of another though separated from it by a comparatively short distance. In any locality, however, the botanizer may hope to find at least a thousand different species within a day's ramble of his home, the exact

number depending somewhat on the topography of the place. In beginning, however, the student is usually far more interested in finding out the names of his specimens than he is in tracing their ranges or ascertaining their exact number. Without a name one is helpless, unable to indicate his plant intelligibly to his friends or to look up its history in the books. He may, it is true, make a pretty close guess at its indentity from its resemblances to some better known plant, but even here appearances are often deceptive and he still lacks that exactness of identification so dear to the hearts of all real plant students.

In such a dilemma, he finds himself in a position to sympathize with those early botanists who with only the crudest of books at hand were confronted, not only with a host of strange plants, but with a multitude without names at all. The way in which they evolved order out of this chaos makes a most interesting chapter in botany but can be only touched upon here. At first the best scheme that could be thought of was to describe the species as carefully as might be but this left no way of mentioning them except by the use of this series of descriptive terms. It was the Swedish botanist Linnaeus who devised the scheme of giving each plant a name of only two words, the first standing for the group to which it belongs and the second its own specific name.

All this, however, presupposes some idea of relationship among plants for until such ideas existed there could not be a group name. The idea that plants are really related and that their resemblances are not purely fortuitous, came very slowly; in fact external appearances were first relied upon to indicate relationship and it was a long time before the flower was recognized at the least changing of plant parts and therefore likely to give the most satisfactory characters for grouping

them. Until real relationships were recognized, therefore, plants had to be classified as edible, poisonous, medicinal and the like. A somewhat better classification was that which divided the plants into trees, shrubs, herbs and lianas or woody vines. Indeed, this classification is still used by nurserymen and seedmen and serves their purpose fairly well. It does not, however, always bring like species together and is therefore anything but scientific.

But even when the plants were properly catalogued there still existed the difficulty of finding the name of an unknown plant. This difficulty was also solved in a measure by Linnaeus, who devised a sort of botanical index or "key" by which a given species might be traced through the maze of plants. By dividing the plants into groups according to the number of stamens they produced, and then subdividing these groups according to the number of carpels possessed, he made divisions small enough to make it reasonably certain that one might soon locate his species. That this was an artificial system was recognized by everybody, but until the affinities of plants were understood it served the purpose. The keys that now are a part of every popular guide to the plants are often highly artificial, the sole object of course being to produce the name of the plant without undue labor or loss of time.

The object of scientific classification however, it to place like species together in a natural grouping and the keys in technical manuals are nearly always based on this arrangement. In some cases both natural and artificial keys stand side by side. The beginner finds the artificial keys easier at first because they sieze upon the most obvious characters for distinguishing the species, but the natural keys give more fundamental differences.

Of the botanical manuals most commonly used, Britton's

has by far the more satisfactory keys, but it is open to the objection that it inclines to make species of every slight difference and the nomenclature employed is one that is discredited by the rest of the world. Gray's manual is much more conservative as to the species and uses the standard nomenclature, but the keys are often very unsatisfactory, being perhaps scattered through the text, or divided into many different sections, any one of which may lead the unwary astray. In Gray's book too, the distinguishing characteristics are italicised in the text, while in Britton's such characters are found in the key. In general one finds that first one key and then the other is more useful and in many cases one book may supplement the other. It might be asked why we should use such keys at all, since the popular handbooks have artificial keys which often trace the species with less labor. The reply, of course, is that the popular handbooks contain only the more showy species and when we are investigating little known plants or closely resembling species, a more exact set of descriptions are needed. So one might as well learn to use the technical keys in the first place.

The general framework of the natural system for identifying plants is very easily understood. The entire plant world is first divided into a number of groups and these are then subdivided according to relationship which is, of course, according to the descent. All those in a single group may be assumed to have had a common ancestor and naturally resemble one another more than they resemble those of other groups. A common method of making the first division is to make four groups. These in the order of their complexity are the Thallophytes (algae and fungi), the Bryophytes (mosses and liverworts), the Pteridophytes (ferns and their allies), and the Spermatophytes (seed-bearing plants). Mod-

ern systematists sometimes make as many as sixteen primary divisions but this adds nothing of interest to the beginner. The usual division of the Spermatophytes is into the Gymnosperms or cone-bearing trees and the Angiosperms or true flowering plants. In other systems of classification these are occasionally given equal rank as primary divisions and known as Strobilophyta and Anthophyta, respectively. Each of the main divisions of plants have entire volumes devoted to cataloguing their species, but books on the flowering plants are naturally more numerous than all the others put together.

VITALITY OF CANNA SEEDS

By J. Ford Sempers

THOSE who have planted the seeds of the garden canna have doubtless noticed the hard, shell-like covering apparently hermetically enveloping the seed. Years ago when the plant was more conspicuous for its foliage than for its blossoms it was sometimes known as shot-plant, a name suggested of course by the hard round seeds it bore.

Gardeners are accustomed to resort to some mechanical means of puncturing this impervious outer covering that the elements necessary to germination may be more readily admitted. This is sometimes accomplished by cutting through the outer covering with a file or emery wheel, but to be more practical the seeds may be placed in a test tube or some similar container and covered with boiling water. A pronounced popping sound follows which indicates the rupturing of the shell like covering. The brief application of high tempature does not appear to affect the vitality of the seeds, but occasionally there will be a few that resist its action. It is

from the somewhat unlooked for behavior of a stray exception or two of this kind, accidently found that the following peculiarities have been noted.

I perhaps would not have been any the wiser but for the presence of a large pile of sandy soil that had been lying near an out building since the autumn of 1901. It had been placed there with the intention of grading about the building and was composed enterely of discarded seed tests made at that time. The material was not used as had been expected and the pile remained undisturbed. No additions were ever made to it in the intervening years. On its north side a sturdy honey locust, (*Gleditsia triacanthos*) twenty feet high and ten inches in diameter, marked the spot where an ungerminated seed had been thrown along with other test refuse that accumulated at the time. The pile contained the remains of the average assortment of seeds to be found in a modern seedsman's catalogue besides those of many deciduous and coniferous trees, and the spores of cultivated ferns.

In later years I sometimes used this sandy soil in potting plants and was astonished at the persistence of so many seed coats that had undergone little or no change in appearance. Eleven years afterwards, (1912) the remains of cucurbit seed coats were conspicuous so that one could readily identify those belonging to gourds, squashes, pumpkins, and melons. In addition there were others, chiefly those of asparagus, beets, onions, okra, spinach and winter vetches. I also found in my sieve at this date, three canna seeds that to all external appearances were uninjured. One I cracked open, finding the seed in apparently normal condition. The other two were placed in a germinator and in a very few days both burst into growth. They were later planted out and developed into large hardy plants; each bearing a large

raceme, the flowers of one being a deep red while those of the other were equally brilliant, but yellow.

In the autumn of 1917 another canna seed was sifted from the sand pile along with a much reduced showing of seed remains; in fact the only other distinguishable seed coats were a few cucurbits, spinach and one each of Martynia and winter vetch. The canna seed, having a rather rough and dingy appearance was promptly germinated in a flower pot. With the approach of frost the young plant was taken indoors. The following winter being a severe one the entire plant was killed above the surface of the soil, though uninjured below. Early the next spring a new growth appeared and after all danger of frost had passed the plant was set out in the open. By early autumn it had made a rank growth and bore large deep yellow blossoms.

The time required to obliterate traces of the seed coats was undoubtedly extended by their being buried in a pile above the surrounding surface from which all surplus water could easily drain, yet the mound retained sufficient moisture to support a heavy growth of grasses. In winter it was repeatedly frozen as hard as a rock during zero weather for perhaps a foot from the surface. It is rather remarkable that the canna seeds would have excluded moisture for so long a time, thus preserving the vital parts against injury.

Objection perhaps to the supposition that the canna seeds found, had remained buried for so long a time may be made on the ground that seeds from recently discarded tests could have been carried and deposited in the sand pile by some burrowing rodent. There is not much on which to support such an objection since the sand tests made in 1901 were discontinued at that time and were followed in the intervening years by an entirely different and cheaper method of

testing in which the refuse was destroyed instead of being dumped in a pile to spread possible fungus infection. No canna plants were grown on the place ,with the exception of the two mentioned, from seeds found in 1912 and none were grown on adjoining premises.

An interesting, but lengthy experiment might be made with canna seeds by packing them in sand, using some kind of indestructible container such as a perforated concrete box that would exclude underground trespassers but allow a free circulation of moisture in the box. The seeds should be so arranged that each would be separated from its neighbor by an intervening layer of sand. The contrivance could then be buried and a part of the seeds tested for germination at intervals of five or ten years. Such an experiment would very likely show whether the peculiarities related above are constant or just mere freaks.

PLANT NAMES AND THEIR MEANINGS—XV
SCROPHULARIACEAE

By Willard N. Clute.

SO like the toad-flax in appearance as to be joint owner of some of the common names in the "snapdragon" (*Antirrhinum majus*). The first syllable in the name is assumed by many to refer to the way the corolla opens and shuts or "snaps" when pressed in just the right way, but Britten and Holland assert that the name is really *snch dragon* which is literally "dragon's snout". It will not do, however, to jump to the hasty conclusion that the common name refers to the flower. An examination of a ripe seed-pod will disclose a truly dragonlike countenance with staring eyes, a broad mouth, and a long snout. It is quite possible that this is the dragon's snout

meant. Other names for the plant are "lion's snap", and "lion's-" "tiger's-" "dog's-" "toad's-" "calf's-" "rabbit's-" and "dragon's-" mouth". "Bunny rabbits" and "bull dogs" are but other names of similar reference.

A fine little plant with flowers suggesting the head of an animal is *Chelone glabra*, commonly known as "turtle-head" but also called "snake-head", "cod-head", "fish-mouth" and "turtlebloom". The name of "shell flower" is quite as appropriate but this term is usually applied to an allied garden plant. An old name for our species is "balmony" a corruption of "bald mony" derived in turn from *baldemoin* which is of obscure origin. The terms "bitter weed" and "salt-rheum weed" allude to real medicinal virtues.

The genus *Scrophularia*, from which the family takes its name is represented on both sides of the Atlantic by plants so nearly identical in appearance that for a long time our plant was regarded as a variety of the other. The European plant, *Scrophularia nodosa*, is the one to which all the common names really belong, though our plant (*S. marilandica*) shares them. The leaves have certain medicinal virtues as the common name "heal-all" indicates and it is probable that the use of the plant in the cure of certain fig-shaped tumors gave to the genus its best-known common name and to the family the appellation in the vernacular by which it is universally recognized. The name "scrofula-plant", like the generic term, alludes to the reputation of the plant in the cure of other ills and "pile-wort" is of the same nature. "Carpenter's square", is a misapplication of a name that seems by rights to belong to one of the mints (*Prunella*).

Another member of the Scrophlariaceae of European extraction, has the distinction of possessing more than sixty common names, which is probably the record in this respect. The

plant is the well-known "foxglove" (*Digitalis purpurea*). It has always been more or less of a question whether the name is derived from the fox or from the fairies (folks). The bulk of the evidence seems to be in favor of the fairies as witness such names as "folk's-glove", "fairy's-glove", fairy-bells", "fairy-cap" and "fairy-thimbles". Variations on the thimble idea are "witches thimbles", "lady's thimbles", or simply "thimbles". It may be observed that the flowers are more like thimbles than gloves as the generic name suggests. Common names that recall those given the snapdragon are "rabbit-flower", "lion's mouth", and "throatwort". The name of "pop-dock" probably refers to the mild explosions made by the corollas when suddenly compressed.

Certain other plants closely related to the species just mentioned are sometimes placed in the genus *Gerardia* and sometimes in *Dasystoma*. The yellow flowers are sufficiently like foxglove blossoms in shape to be given the same common name though it is customary to prefix this with "false" to indicate the difference. *Gerardia flava* is the "yellow foxglove" or "downy false foxglove" and *Gerardia Virginica* is the "smooth false foxglove" or "golden oak". The last mentioned name refers both to the flowers and the oaklike leaves. *Gerardia pedicularis* has accumulated a larger number of common names. It is called "yellow gerardia", "bushy gerardia", "lousewort" and "fever-weed". With reference to the divided leaves it is called "fern-leaved false foxglove" and "lousewort false foxglove". The "lousewort" part of the name comes from the fact that the leaves are very much like the leaves of the true "lousewort" (*Pedicularis*) in appearance. In recent years this genus has received still another change of names and by some botanists is now known as *Agalinis*. When the change was made the common names of the plants were promptly

changed to "yellow agalinis", "fern-leaved agalinis" etc, in this showing how uncommon a common name may become. All the other species of *Gerardia* are so universally called by the generic name that this has virtually become a common name as well. *Gerardia maritima* is further distinguished by the names "seaside gerardia" and "salt marsh gerardia". The woolly-leaved *Seymeria macrophylla* is sometimes known as "mullein false foxglove".

The numerous species of *Veronica* are reputed to derive their names of "speedwell" from the fact that the flowers fall and speed away so soon after opening. It will be remembered that a companion ship to the famous Pilgrim ship, Mayflower, was named Speedwell, and true to its name came to a speedy end. Thus narrowly did the speedwells miss canonization among our "national flowers". To judge from the number of common names, English speedwell (*Veronica chamaedrys*), which has escaped to America, is the best known. "Germander speedwell" as we have elsewhere shown, is derived from the specific name, while "God's eye", "angel-eye", "bird's-eye", "cat's-eye", "blue eye" and "eye-bright" refer to the color and brightness of the flowers. "Base vervain" distinguished this from certain species of true vervain (*Verbena*) while "forget-me-not" though quite appropriate is a name that by general consent is bestowed on the species of *Myosotis*.

Veronica arvensis is the "corn speedwell" from its habit of growing in English corn (wheat) fields, *V. Tournefortii* is the "Byzantine speedwell", as well as "bird's-eye" and "cat's-eye" and *V. peregrina* is the "purslane speedwell" and "neck-weed", the latter name alluding to its early use in the treatment of scrofulous swellings on the neck. The "field" or "garden speedwell" is *V. agretis*. This is also known as "germander chickweed" and "winter-weed". *Veronica hederaefolia* is the

"ivy-leaved speedwell" and "ivy chickweed" from the shape of its leaves and "mother-of-wheat", "small henbit" and "winter-weed from its appearance or place of growth. *Veronica serpyllifolia* is the "thyme-leaved speedwell" and "Paul's betony". Concerning the latter name it may be said that the true betony is a mint (*Betonica*) and that there does not appear to be any indication as to who Paul was. The same name, however, is applied to *Veronica officinalis* and this species is also called "ground hele" (heal?), "upland speedwell", "fluellin" and "gypsy weed". *Veronica scutellata* is the "American brooklime". "Brooklime" is said to be a middle English name meaning brook and plant. The European brooklime is *V. beccabunga*. Our species is also known as "blue-bells" and "wallink". *Veronica anagallis-aquatica* is the "water speedwell", or "water pimpernel". The last mentioned name is more commonly referred to another little plant (*Anagallis arvensis*) of the primrose family which is much like it.

Veronica Virginica is a species so different in habit from the majority of speedwells that it is often placed in a separate genus (*Leptandra*) or at any event, in a separate section of the group. It is most commonly known as "culver's physic" or "culver-root" both of which appear to be fanciful names, for "culver" is an ancient term for dove and doves seldom are in need of medicine. The plant was once regarded as a desirable drug under the name of "Beaumont's-" or "Bowman's-root." "Brinton's-root" is a name of similar import. It will be remembered that a species of *Gillenia* is also called "Bowman's-root". The question as to who Bowman and Brinton were and how this came to be their root, is referred to my readers for answer. I have been unable to throw light on the subject. The plant is also called "tall speedwell" and "black-root", neither name needing an explanation.

The *Pentstemons* are so well known to plant students that the generic name serves as the common name for most species. The name, however, is decidedly appropriate for the group which is practically the only one in the family to have five stamens, though there are many indications in the flowers of other genera that an additional stamen has been lost. The fifth stamen in the group under discussion is in most cases covered with hairs from which circumstance the name of "beard-tongue" arises. *Pentstemon hirsutus* is called "hairy beard-tongue", which seems somewhat redundant until we learn that the adjective refers to the leaves and not to the stamen. *Pentstemon acuminatus* is called "St. Joseph's wand" without any very obvious application.

The plants of the genus *Pedicularis* are commonly known as "louseworts" from a belief that these plants are concerned in the lousiness of cattle. *Pedicularis Canadensis* is most frequently called "wood betony" though the name belongs by right to species of *Betonica*. "Head betony" is a variation of the name which might indicate that the lousiness was not always confined to cattle though it probably refers to the heads of flowers. The name of "high heal-all" distinguishes our plant from at least one of the accepted "heal-alls", a species of *Prunella* to which it has a passing resemblance though it is much taller. The name of "beef-steak plant", given by Britton and Brown is a puzzle. "Snaffles" alludes to the shape of the flowers which somewhat resemble part of the snaffle-bit for horses. The word snaffle, itself, is an old word meaning beak or bill. From the shape of the flowers, also, *Pedicularis Groenlandica* is known as "red elephant". *Pedicularis palustris* is the "purple pedicularis", "marsh lousewort", and "red rattle", the last named being doubtless due to a confusion of this plant with the species of *Rhinanthus*. The color of the flowers in

P. palustris might entitle it to be called "beefsteak plant". "Cow's wort" may be another name to indicate that cows become lousy when feeding where this plant grows.

The true "rattle" is regarded as being *Rhinanthus crista-galli*. It is also known as "yellow rattle", "rattle-box", "rattle bags", and "penny rattle" being so called because the seeds rattle in the inflated pods at maturity. "Penny-grass" and "money-grass" appear to be other variations of "penny rattle". "Yellow cock's-comb" of course alludes to the flowers and "cow-wheat" may be another name connecting this plant with the species of *Pedicularis* though it may be added that this latter name is the only common name of *Melampyrum lineare*. The reason for applying this name to the latter plant is difficult to fathom. The species is an insignificant weed in dryish woods and probably never comes to the attention of the cows.

Anyone who has seen *Castilleja* in bloom will at once recognize the significance of such names as "scarlet painted-cup", "Indian pink", "Indian paint-brush", "red Indians", "bloody warrior", "nose-bleed", and "prairie fire". The word Indian appearing in several of the names seems to be for the sole reason that the flowering bracts are bright colored and therefore assumed to be pleasing to the Indian's taste. "Wickawee" sounds very much as if it might be the Indian name for the plant. It might be said in passing that the flowers of this genus are dull colored. The brilliance of the flower heads is due entirely to the bracts.

The rather insignificant weeds included under the sonorous name of *Gratiola* were once thought, as the name indicates, to be especially favored medicinal plants, hence the name "herb of grace" applied to the species once known as *Gratiola monniera* but now called *Bacopa monniera*. Other names alluding to its supposed medicinal virtues are "water hyssop" and

"hedge hyssop". *Gratiola Virginica* is the "clammy hedge hyssop" and "golden pert", the latter name of no obvious application.

Paulonia tomentosa, formerly *P. imperialis*, is usually called "empress tree", but "princess tree" would be somewhat nearer the facts since the species was named for the daughter of a Russian king. The name of "blue catalpa" is expressive, though the catalpa belongs to another family. Our plant is sometimes called "neckweed" because reported to be useful in curing scrofula. In the Southern States the tree is generally known as "cotton-wood" in allusion to its extremely brittle branches. "Napoleon", reported from Virginia, is an attempt of the illiterate to use the generic name.

As often befalls plants that are either very conspicuous or quite inconspicuous a number of species in the Srophulariaceae have but a single common name, if, indeed, they have any at all. Thus we find *Schwalbea Americana* universally called "chaff-seed" and *Ilsanthes dubia* called "false pimpernel". *Limosella aquatica*, from its habit of growing in the mud, is known s "mudwort" or "mudweed". *Buchnera Americana* is called "blue hearts" for no obvious characteristic. *Collinsia verna* is appropriately named "innocence" and "blue-eyed Mary", from the bi-colored violet-like flowers, *Mimulus ringens* is everywhere known as "monkey-flower" though it requires a great stretch of the imagination to see in the flower any likeness to the face of a monkey. An allied plant of our gardens is called "musk flower" or "musk plant" from its odor. *Euphrasia arctica* and *E. Americana* are both known as "eye-bright" doubtless from the shape of the flowers and *Odontites rubra*, a European weed rather uncommon on this side of the ocean is known as "red eye-bright".

NOTE *and* COMMENT

Cactus Culture.—It is strange that those interested in the growing of cacti have not thought it worth while to study the plants in their native habitat in order to discover what kind of treatment suits them best. The cactus, like the donkey, can exist under extraordinary hardships and a good many people have jumped to the conclusion that they need such conditions to thrive. Both, however, readily respond to better treatment. The cactus lives in the desert simply because it finds there the conditions that will protect it from other forms of vegetation. When it grows elsewhere, more luxuriant plants soon overshadow it. The desert is its protection. But even in the desert, it is not so badly treated by nature. During the growing season it is drenched by rains almost daily. When it is dry and not growing, it is no more to be pitied than is the rose when it throws off its leaves and stands with bare twigs during the winter. If you want your cacti to grow, therefore, do not spare the water. One must remember, however that cacti grow in sandy or rocky places where the water runs off immediately, so look well to your drainage. With good drainage and plenty of water during the hotter parts of the year most remarkable results may be obtained. One specimen so treated made more growth in a single summer than it had made in the previous ten years combined. Two joints of another from Florida made nearly fifty new joints and bloomed the first season. Hundreds of others did nearly as well.

It is interesting to know, also, that when the plants are given the right conditions, a large number will live out of doors all winter even as far north as Chicago. Cacti from Santa Fe and from the middle of the Painted Desert have survived winter thus when the temperature went to 25° below zero. cacti of your region therefore is to kick specimens into a comso long as it is exceptionally well drained. They will grow in ashes, sand, or very stony soil and in the wild are often found in the "dobe" soil from which the sun-dried bricks for building are made. In passing it may be mentioned that the city of Joliet now has one of the best collections of cacti in the northern States having had collectors in the field for the past four years. The curators now feel warranted in offering to name specimens for others. All that is needed to know the cacti of your region therefore is to kick specimens into common fiber box and mail to the editor, who will turn them over to the proper authorities. No packing is needed. except to keep them from rattling about in the box.

PHLOX STELLARIA.—Who knows where *Phlox stellaria* can be found? The plant is very much like *Phlox bifida* in appearance, the principal difference being that the corolla lobes of *P. bifida* are cleft down to the middle while those of *P. stellaria* are merely deeply notched into oblong lobes. This latter species is also regarded as smoother than the other, but the plants from Grand Tower, Jackson County, Illinois, reported by Professors Trelease and MacDougal are pubescent. Both plants are species of the Middle West with fairly limited ranges. Gray reports *P. stellaria* from the cliffs of the Kentucky river, southern Illinois and barrens of Kentucky, but a subscriber who searched such cliffs as he could find along the Kentucky river failed to discover the plant and explorations in the vicinity of Lavergne, Tennessee, from whence Gat-

tinger reported it, was also barren of results. If any of our readers know of the plant, we would be glad to hear from them. Is there such a species as *Phlox stellaria* or is it a mere variation of *P. bifida?*

Sneezeweed in Oregon. I wish to record the finding of the "sneezeweed" *Helenium puberulum* at Brownsville, Oregon. This is an extension of the range of this plant approximately three hundred miles northward, its previous northern limit according to competent botanists, being in Humbolt County, California. The plant as I find it here is quite rare, but seems to be quite widely distributed.—*Leslie L. Haskin.*

Idaho Weeds.—I have remarked before upon the large number of old world weeds in the intermountain region. I have two new ones to report, of more than ordinary interest. *Atriplex laciniata,* a native of Europe not reported before in the United States. This is well established here (Pocatello, Idaho) as I found it in considerable quantities in several places in vacant lots on the east side. This section has been inhabited by Greeks and Italians for many years so the connection is easy to establish. This plant is called locally "pink weed" and occurs with *A. spatiosa* which it somewhat remotely resembles. The other plant is *Lancisia coronopifolia,* a South African plant extensively introduced on the Pacific coast but not collected inland before. It is a water plant spreading in the ditches in North Pocatello. It is a member of the Composite family distinguished by the conspicuously sheathing petioles. It grows in prostrate mats, rooting at the nodes, in the mud on the banks, or upright, taller and more succulent in the water amid the long grasses. —*Mrs. M. E. Soth.*

Growing Plants in Closed Jars.—During the past summer, I had my attention called to a case of growing flowering plants indoors without any care being taken of them. Plants of partridge berry (*Mitchella repens*) were collected in west central Michigan in August, 1921, brought to Chicago and placed in a glass aquarium jar about eight inches in diameter, along with some of the soil from the place where the plants were obtained. A moderate amount of water was put in the jar and the top put on over a rubber ring, sealing the jar very nearly if not quite air tight. The jar was kept in an apartment without at any time being exposed to the direct sun. During the winter it was kept above a radiator, which was usually turned off, and during the summer it was allowed to remain close to the house wall on a heavily shaded porch.

When seen by me the plants were very thrifty and looked very close to normal, although it had had neither sun nor water for somewhat over a year. This particular specimen had not flowered, but I was told that in previous years specimens similarly treated had flowered and fruited under these conditions. As the previous specimens had been thrown out late in spring, it is not possible to state how long such a plant might be maintained under such conditions. This might prove a useful hint for someone to have green things growing in his house even under apparently most unfavorable circumstances. The partridge berry seems to be very suitable, possibly because it naturally grows in deep woods, receiving direct sun only early in the spring or in the fall when the trees have lost their leaves.—*Frank C. Gates.* (In the *Fern Bulletin*, vol. 20, page 75 is an account of a fern that had lived for more than eight years in a tightly sealed bottle five by three inches in size. Possibly ferns are more

susceptible to this treatment than flowering plants, but it now remains for somebody to can a number of our smaller plants and report results. Think of an entire canned garden! It is worth trying.—Ed.)

Man's Parasites.—Although man furnishes the most striking illustrations of the ease with which both the parasitic and host roles may be assumed by a social animal, his capacities in this direction have been but little appreciated by the sociologists. Our bodies, our domestic animals and food plants, dwellings, stored foods, clothing and refuse support such numbers of greedy organisms, and we parasitize one another to such an extent, that the biologist marvels how the race can survive. We not only tolerate but even foster in our midst whole parasitic trades, institutions, castes, and nations, hordes of bureaucrats, grafting politicians, middlemen, profiteers, usurers, a vast and varied assortment of criminals, hoboes, defectives, prostitutes, white-slavers, and other purveyors to antisocial proclivities, in a word so many non-productive, food-consuming, and space-occupying parasites that their support absorbs nearly all the energy of the free members of society. This condition is, of course, responsible for the small amount of free creative activity in many nations. Biology has only one great categorical imperative to offer us and that is: be neither a parasite nor a host and try to dissuade others from being parasites or hosts.—*W. M. Wheeler in Scientific Monthly.*

Cuban Yucca.—An item in one of the horticultural journals mentions the formation of a company in Havana for the production of starch from the Cuban yucca. This recalls the fact that the plant called yucca in Cuba is what is more familiarly known as the cassava plant (*Manihot utilissima*). This is undoubtedly the original yucca. The name

has since become attached to a very different group of plants of our Southwest through an error of old Gerarde, author of the "Great Herbal".

THE ANOMALOUS LICHEN.—The lichen is the only living object in the world that is entirely vegetable without being a plant! In the vegetable kingdom new individuals come into existence as the result of the union of an egg and a sperm derived from plants like themselves, but the lichen has no parents. It does not grow from a fertilized egg and does not conform to our ideas of a species. Practically everybody is aware that lichens are composed of two very different kinds of plants—an alga and a fungus—which live in partnership and from what might, by some stretch of our definitions, be described as a physiological species in contradistinction to the more usual kind. In this association of alga and fungus a new plant-body is formed that is quite different in appearance from either member of the partnership when growing alone. The fungus partner in the lichen forms spores which may develop into new fungus plants but if they come into contact with the right kind of algae they produce lichens. A lichen once formed reproduces vegetatively by means of soredia which consist of alga cells entwined by strands of the fungus. On many lichens one may find tiny plate-like projections heaped with these minute packages of fungus and alga ready to be blown away by the wind. The lichen is particularly resistent to the influences that hinder the growth of other plants and in consequence is often the only form of life present in deserts, on mountain tops and other inhospitable places. Lichens are also among the most variable of living things. They range in form from microscopic dots on exposed rocks to crustlike masses, leafy thalluses or even bushy forms. They are most luxurious, of course, in the

tropics and there one species attains a length of more than thirty feet! Their color is perhaps most frequently gray-green, but it may be brilliant red or yellow, dead black or pure white. They live on rocks, earth, the trunks of trees or even on the leaves; and one species is reported to be truly aquatic. Several kinds are of economic importance, among them the reindeer moss, the chief food plant of grazing animals in the far north. Several others have been used as food for man in an emergency. The manna of the Israelites is supposed to have been a lichen. Still other species have been known from hoary antiquity as a source of dyes.. The familiar litmus so commonly used as an indicator of acids and alkalies is obtained from a lichen. Last but not least of the lichen's good qualities is the effect it has upon the rocks, steadily breaking them down into soil in which other plants can grow.

Origin of Life.—The only living things on our planet that can change carbon dioxide and water into foods are the plants. They are able to do this by means of minute green bodies in the leaves and other parts which turn the energy in sunlight into a form which they can use. Recently it has been discovered that the ultra-violet rays of "light" can change carbon dioxide and water into sugar just as the green bodies or chloroplasts do. Here we have an instance of the formation of food upon which beginning plants might live without the assistance of the plant green. It has always been assumed that the first plants were green, but with a source of food present, this would not be necessary. Plant food, however, is not protoplasm. This latter substance, which is the only part of a plant that may be said to be alive, is far more complex than simple sugars, but it is reported that even this may be formed if the necessary mineral salts are present under conditions of-

ten existing on the earth. From this one may draw the conclusion that the first plant may have received its start in life through some such process.

Growing Easter Lilies from Seeds.—Several lilies are known as Easter lilies from their use at Easter, but the one usually referred to when the florist uses this term is a white-flowered species from Japan known as *Lilium longiflorum*. The common white or Easter lily of northern gardens is *Lilium candidum*, but it blooms too late for Easter and is more frequently called Madonna lily or Annunciation lily. This latter species is quite hardy but *L. longiflorum* is less resistent. It is, however, hardy as far north as Washington and experiments made recently indicate that it might be profitable to grow it out-doors as a commercial enterprise. Seeds sown in the greenhouse early in January produced plants that were ready to go into the ground by April or May and several of these flowered before the autumn frosts. A few produced as high as a dozen blossoms on a stem. At the end of summer the bulbs measured from six to eight inches in circumference and when removed to the greenhouse gave as good blossoms as those grown from imported bulbs. Bulblets from which a new stock of bulbs may be produced are found on the stem near the surface of the ground and even the scales broken from the old bulbs when digging may be planted like seeds and will soon produce new bulblets. Sections of the stem, treated as layers, will also produce bulblets. If desired the old bulbs may be left in the ground over winter but they are generally taken up, potted, and brought into bloom. They have been held in cold storage for at least two years and then have given a good account of themselves in producing flowers.

Insects and Pollen.—In general, insect pollinated flowers are showy and wind pollinated flowers inconspicuous, but the insects often fail to play the game according to the rules and visit many flowers that seem properly designed to be pollinated by the wind. As a matter of fact the abundant pollen of various wind pollinated flowers must often attract insects that normally visit more showy specimens. Nor should it be forgotten that pollen as well as nectar is food for insects. A a recent meeting of the Torrey Botanical Club, O. P. Medsger mentioned the fact that bees often visit the blossoms of timothy grass for the pollen. He also reported that mining bees, living on the edge of the New Jersey marshes, collect much pollen which they fashion into balls half an inch in diameter. This is used as food by the developing larvae. The speaker was of the opinion that our native plants are mostly pollinated by native insects and that honey-bees, themselves introduced from Europe, are the chief agents in pollinating the flowers of introduced plants.

Orchid Seeds.—Darwin held that in general, plants which produce a large number of small seeds are lower in organization than those which produce a smaller number of better-equipped seeds. Orchids, however, are regarded as the highest type of Monocotyledons and yet their seeds are among the smallest produced by flowering plants and are so incomplete as to lack an embryo. Darwin estimated that a single seed-pod of a species of *Cephalanthera* contained more than six thousand seeds and that a single flower spike of *Orchis mascula* contained 186,000. This, however, is far short of what orchids can do at their best for Fritz Muller estimated that a single capsule of a *Maxillaria* yielded 1,756,440 seeds. One reason for this great profusion of seeds seems to be that orchids depend upon a fungus partner for satisfactory growth

and since the fungus is not present in every soil, a great number of small seeds enables the species to search the world thoroughly for it in a way that they could not do if they possessed fewer and larger seeds.

Acid Soils.—Only a short time ago, no attention was paid to the effects upon plant growth of acids in the soil. Now it is known that the presence or absence of such substances profoundly affects the distribution of plants. The principal acids that are regarded as rendering the soil sour are acetic, citric and lactic. Contrary to common opinion, it has been found that the majority of plants favor a slightly acid soil. It is, of course, impossible for the ordinary plants to thrive in soils as sour as those favorable to the growth of heaths, pitcher-plants, and bog-plants generally. In artificial bogs and other plantings of acid-soil plants, tannic acid has often been employed to give a proper acidity to the soil but since acetic, lactic, and citric acids have been found to have the same effect it might be possible to produce the required acid conditions by the application of vinegar, lemon juice or sour milk.

Owners of Complete Sets.—Since the last report additional sets of this magazine have been distributed as follows:

69. F. L. Green, Greenwood, Ontario, Canada.
70. Amherst College, Amherst, Mass.
71. Herbier Boissier, Geneva, Switzerland.
72. Dr. Charles Vetter, 67 West 12 St., New York.
73. Wm. E. Brodersen, 1917 Ellis St., San Francisco, Calif.

Mr. Green's set is the second Canadian set and that of the Herbier Boissier the first complete set in Europe. There are now eighteen sets remaining and the price has been ad-

vanced to $17 for the first 25 volumes or $21 for sets complete to the present year.

Catching Cold.—There are various ways of collecting plants, and catching cold is one of them! When we used to speak of "catching cold" we thought that in some way our trouble was caused by a lowering of the tempature, but it is now pretty well understood that we really do catch a "cold" germ, a small plant which proceeds to live upon our tissues and causes the sore throat, cough and other symptoms that accompany a "cold in the head." One of the easiest ways of catching cold is by being infected from bedding, mufflers, and articles of winter clothing that have been packed away and in which the germs lie snugly concealed during the summer ready to get in their deadly work when these articles are brought into use again during the first cold snap of autumn . In packing away winter clothing, therefore, it is well to first rid them of their plant inhabitants. This may readily be done by sprinkling the clothing with formaldehyde which may be bought at the nearest drug store for a small sum. Formaldehyde, or its weaker solution, formalin, is the substance the wily milkman sometimes puts into the milk to discourage another small plant which otherwise would sour it. It was recently reported that cold in the head is the most popular indoor disease in America. More than a hundred million people indulge in it annually. A subscription to this magazine, plus a nickle's worth of formaldehyde, will, however, enable anyone to avoid the plant, escape the doctor, and live happily ever after.

American Tulips.—We have depended upon Holland adjacent countries for our tulip bulbs for so long that the impression has become general that marketable tulips can be produced nowhere else. It has long been assumed that there

is something in the soil or climate of such regions that renders them peculiarly suited to the production of bulbous plants. That this is an error is shown by a recent Bulletin (No. 1082) from the United Statess Department of Agriculture in which David Griffiths gives a survey of tulip growing in America. Tulips as good as any that are imported have been grown to a limited extent in Michigan, Vermont, Virginia, California, Oregon and Washington. It is apparent, therefore, that nearly any region with a rich friable soil and not too warm will produce good bulbs. The most extensive experiments in tulip growing in this country have been made in the vicinity of Bellingham, Washington, where the Government maintains a station for this work. The bulletin states that any full-grown tulip bulb is certain to produce a flower if handled properly and that the cause of unsatisfactory bulbs is to be found in careless handling of the bulbs after they are dug As is so frequently the case, ripening continues in the bulbs for weeks after they are dug. Under ideal conditions more than 150,000 bulbs large enough to flower have been produced on a single acre. The tulip has few if any diseases and can be grown to maturity in a single season.

EDITORIAL

The August number of this magazine may be a few days late, owing to the fact that the Editor expects to be conducting a botanical exploring party across the Painted Desert of Arizona in July. The party will visit the Pueblo Indians, the cliff ruins, Navajo Mountain and the Rainbow Bridge and hope to bring back a rather complete collection of the plants. The region is one that has never been explored botanically but previous trips have shown the flora to be most interesting. If any of our readers care to join the party, we can find place for one or two more. Transportation part of the way is by horseback and sleeping accomodations consist of a soft bed in the sand. Food will be plain but sufficient. That the trip will not be too strenuous may be assumed from the fact that nearly half the party are women. The cost, aside from the railway fare, is negligible.

* * *

Each year a thousand or more new readers ask for sample copies of this magazine. If all subsequently subscribed our circulation would justify a much larger magazine than we publish at present, but unfortunately they do not. As a matter of fact it requires a rather philosophical type of mind to appreciate the matter we publish. Without attempting to compliment our readers we must nevertheless add that without a single exception, all who are personally known to us are above the average in intelligence. After thinking the matter over we are disposed to think that this is also a compliment to us. Whenever we find a new reader with the type of mind

indicated, he subscribes as a matter of course and if he renews his subscription he rarely fails to continue with us for an extended term. We have many subscribers who have been with us for twenty years and at the present time perhaps five percent are paid up to the end of 1927. More than half of our subscribers are on our permanent list, having ordered the magazine sent until we are notified to stop. If any of those who have recently joined us think well enough of it to wish it continued we suggest that an order to transfer their names to the permanent list does not pledge them to subscribe for more than two years and does secure the magazine at reduced rates. Further particulars will be found on our regular subscription blanks. At this time we also take the opportunity to solicit more short notes from our readers. We are of the opinion that more and shorter articles are desirable and shall endeavor to make this change in our contents as soon as such matter can be secured.

BOOKS AND WRITERS

Fire in the printing plant of the *Guide to Nature*, late in February, destroyed the stock of paper, cuts and other material belonging to the magazine. * * * There was no insurance. * * * Editor Bigelow says that this is his first real fire though he has been under fire many times. * * * This reminds us that Southern legislators are making it hot for the evolutionists. * * * Texas and Oklahoma have joined South Carolina and Kentucky in putting an end to evolution by law. * * * Now if they would only legislate the boll wevil out of existence. * * * Just like Volsted exterminated the yeast plant! * * * Facts are stubborn

things and refuse to be bound by man-made laws. * * * So is and does evolution. * * * However, if we remember correctly, Mr. Noah's family give rise to all the different kinds of people on this planet. * * * Kentucky ought to do something about this! * * * It sounds just like evolution. * * * Somebody is always obliging enough to do the thinking for the rest of the world. * * * A newly appointed Commisioner of Indian Affairs is devoting himself to the religion of the Indians. * * * Expects to convert them by law. * * * He says the religious dances of the Indians is distasteful to him and they really must not do it. * * * And yet the Turk has been accused of being religiously narrow-minded! * * * The new *Nature Magazine* has come up to expectations. * * * It is remarkably well illustrated and presents the showier side of nature very attractively. * * * It is bound to be popular. * * * Some of the nature books are coming back. * * * Macmillan's have issuer Peterson's "How to Know Wild Fruits." * * * This is the only book on the subject. * * * It costs $1.75 and is worth it. * * * There are about 450 plants on Santa Catalina Island and L. W. Nuttall and C. F. Millspaugh have told about them in a publication of 297 pages, issued by the Field Museum. * * * They found two young plants of the "California Poppy" on the beach and pronounced them a new species which they named in honor of a prominent chewing-gum manufacturer. * * * Yes, they did! * * * There are some truly remarkable plants on Santa Catalina and somebody should give us a less technical account of them. * * * Anybody who has never seen the *Joemma Bulletin* has still something in the botanical line to look forward to. * * * You can get a copy free by addressing Joe Smith, Longbranch, Wash. * * *

The address of Eva Kenworthy Gray who is publishing the *Flower Journal* is 32nd and Woolman Avenues, San Diego. * * * Several issues have appeared and the publication shows indications of surviving. * * * "The Fern Lovers' Companion" is probably the most successful fern book ever written. * * * It has been taken over by Little Brown & Co. of Boston, at a price calculated to make the authors of all other fern-books envious. * * * We again congratulate the author. * * * The *Ohio Journal of Science* has changed from nine numbers a year to bi-monthly. * * * The January issue begins the twenty-third volume. * * * "The Field and Camp Notebook" is a fat little book designed to make out-door note-taking easy. * * * It is by Comstock and Vinal and published by the Comstock Publishing Company, Utica, N. Y. * * * There are many fine drawings of birds, flowers, mammals, insects, etc., outlines for studying them, and star-maps for the different months. * * * Most of the outlines are excellent but we were disappointed in the one for studying an animal. * * * We tried it on the earthworm and it would not work. * * * Wonder if they could have meant this outline for the study of *mammals*?

Walter Stager's "Tall Bearded Iris" is probably the first book devoted exclusively to the iris that has appeared in America. As its name indicates, it deals with only one branch of the Iris Family—the group commonly known as German Irises—but since this is the group from which most of the garden irises are derived the book may be said to cover that part of the subject of interest to iris growers. The author's sub-title is "A Flower of Song" and this is justified by some 200 quotations referring to the iris, some of which run to

more than a page each. A chapter is given to the origin of the names, another to the use of the iris in art and trade, and then follow more practical chapters on structure, planting, cultivating, propagating, insect and fungus enemies, etc. The book ends with a rather extensive descriptive list of the better varieties and includes a list of standard and recently introduced varieties graded by the recent "iris symposium". The book is exceptionally well printed and has a fair number of illustrations All iris fanciers will, of course, add it to their lists. It is published by Madison Cooper, Calcium, N. Y. at $2.00.

The book of "Hardy Perennials" recently issued by Charles Scribner's Sons, is by a British author, A. J. MacSelf, the founder of the National Hardy Plant Society of England and naturally reflects somewhat the British view-point. The first part of the book contains seven chapters on preparing the soil, planting, cultivating, and the like, all of which is useful and up-to-date. The larger share of the volume is taken up with "Plants Worth Growing" an alphabetically arranged list of all the hardy perennials commonly grown in Great Britain. The notes on the different species are not of the stereotyped botanical kind, but appear to have been made from the author's personal experience with the plants. They consist of opinions as to their value for cultivation, special ways of growing them, the selection of the best varieties, and notes on color, form, floriferousness and the like. The book, of course, can not be unreservedly recommended to beginners in America, but it is an excellent presentation of how the plants are treated in English gardens, from which all can learn much. In make-up it suggests Thomas' "Hardy Perennials" and since this latter volume is now out of print the new one should be especially welcome. It contains upwards of 200

pages and is illustrated by 8 colored plates and others in black-and-white. The price is $2.75.

The greatest objection to many books intended for the identification of the trees, is that the keys they contain are too frequently based on characters to be found for only part of the year. For instance, a key based on flowers or leaf characters is of little use in winter, while one that is concerned principally with fruits is hopeless in spring. In a re-issue of Dr. John H. Schaffner's "Field Manual of the Trees", the objections have been met by the inclusion of three keys; one to the trees in the winter condition, one for the summer condition, and a third after the common style of botanical keys which takes advantage of any salient character. Following the keys, all the species north of Virginia, Kentucky, and Missouri, and east of the Prairie region, are described in untechnical language with additional keys to the species of each genus. In estimating the radical or conservative tendencies of tree books, one may always depend upon the treatment given the genus *Crataegus*. In the present volume 52 species are recognized, while from essentially the same region Britton's Manual lists 31 and Gray's 65. Incidentally, for once, at least, Britton escapes being regarded as a radical. In addition to a description of the species, the book includes the uses to which they may be put. The nomenclature is America's own private brand which even so good a book as this cannot make respectable. The volume is published by R. G. Adams & Co., Columbus, Ohio.

The series of "Open Country Books" recently inaugurated by the Macmillan Company, New York, is described as "a continuing company of genial little books about the out-of-doors." It leads off with a book about the Apple Tree by L.

H. Bailey, the editor of the series, followed by books about the cow, the vegetable garden, and vacation camping, with promise of many more of similar nature. Dr. Bailey's book might be described as a series of essays on the history, botany, cultivation, propagation, and uses of the apple. From the first chapter which describes a land "where there is no apple tree" to the seventeenth and final chapter on the "appraisal of the apple tree" the book is full of information told in an attractive way. The apple is one of the oldest of cultivated fruits. Charred remains of diminutive apples have been found on the sites of the prehistoric lake dwellings in Switzerland. The apple seems to have originally grown wild in central Europe but has since followed man to all the cooler parts of the world and now is found wild in many of them. It is so much a part of the landscape that the author devotes one chapter to this phase of his subject. The book is well worth reading, not only by lovers of out-doors but by commercial growers of the fruit as well. The price is $1.50.

It perhaps needs a peculiar type of mind to get excited over the study of grasses. The flowering parts are so unlike the flowers of better known plants that the novice is much perplexed at beginning. In Agnes Chase's "First Book of Grasses," issued by the Macmilan Company, New York, the author well says that it is impossible to make a book on how to know the grasses that may be used without mental effort, but those who really want to study these plants no longer have the excuse that they lack directions for beginning. In this new grass book, a very clear account is given of the puzzling structure of the flowers accompanied by many of the excellent drawings for which the author is noted. The book begins with the simplest and plainest forms and carries the student on through a series of twelve lessons to the more complex variations from

the type, and since the identification of grasses is based almost entirely on the flowers, the student is soon in possession of the information needed to make the work easy. As a matter of fact, grass flowers, which at first seem so complicated are in reality very simple. They lack the showy calyx and coralla of more familiar flowers but stamens and carpels are like those of ordinary flowers and the chaffy scales mixed with them may be referred to the bracts that are present in so many other flower-clusters. Using this book to start with and a good manual of the grasses for reference, it would seem as if anybody might soon become acquainted with the grasses of his region.

The most sumptuous volume on the pear ever issued in America is without doubt the volume published by New York State in its series of Fruit Monographs. Previous volumes have dealt with apples, plums, cherries, grapes and peaches. The present issue, like the others, is a quarto profusely illustrated by colored plates. The six hundred pages of text were prepared by Dr. U. P. Hedrick and a corps of assistants and comprises about everything known about the pear. Though entitled "The Pears of New York" it is really an account of the pears of the world and as the preface observes it aims to make a complete record of the development of the pear wherever cultivated up to the present time. The evolutionary history of the pear is involved in some obscurity. It is a fruit of northern origin and did not appear in civilized gardens as early as other fruits. It is said that the bible fails to mention this fruit and that it has no name in the Sanscrit or Hebrew. The twenty or more wild species of pears are all natives of Eurasia. The pear genus, however, is of much wider distribution. There are at least sixty species in it, among them several that are American, such as the mountain

ash and the choke-berry. None of those we regard as true pears have been found on any part of the Western Hemisphere, or south of the equator in the Old World. Several species are found in Korea, China, Japan and Persia and the others in western Europe. There is great variation in the size and quality of the fruit; one species illustrated in the book has fruits no longer than grapes. Only three of these wild pears seem to have been drafted for garden use. Of these the most important is *Pyrus communis* of southern Europe and Asia. *Pyrus nivalis* of southern Europe and *P. serotina* from China and Japan are the others. From these by hybridization have sprung several hundred varieties, few of which have sufficient merit to be of value. Owing to difficulties that attend keeping and marketing pears, this fruit is not as extensively grown in America as are apples and peaches. The present volume ends the series of books devoted to tree fruits, but it is intimated that in time we may have a new series dealing with small fruits. The books thus far issued are invaluable as reference works and unsurpassed in beauty, accuracy, and general excellence..

After all, where is the flower lore? for the first book, not the last, should contain the poetry of flowers. The Natural System may tell us of the value of a plant in medicine or the arts, or for food, but neither it nor the Linneau to any great extent tell us its chief value and significance to man. There will be pages about some fair flower's qualities for food or medicine but perhaps not a sentence about its significance to the eye (as if the cowslip were better for greens than for yellows) about what all children and flower-lovers gather flowers for.—Henry D. Thoreau.

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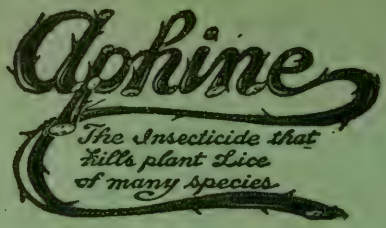

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WILLARD N. CLUTE, EDITOR

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THE CENTURY PLANT

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THE AMERICAN BOTANIST

VOL. XXIX AUGUST, 1923 No. 3

How deepening bright, like mounting flame doth burn
The goldenrod upon a thousand hills!
This is the autumn's flower and to my soul
A token fresh of beauty and of life,
And life's supreme delight.

Richard Watson Gilder.

THE CENTURY PLANT

By Mrs. O. A. Budd.

THE accompanying illustration shows the species of century plant that is found growing wild in the northern part of Arizona. The blossoms, which are reddish-yellow, are very similar to banana flowers. They have no fragrance but keep perfectly for several weeks. It is the custom here to bring in a blooming specimen from the hills and fasten it to some post down town to give visitors an opportunity to see this curious plant in bloom.

In Florida the natives claim that the plant must be a hundred years old to bloom, but in Arizona they bloom in less time. How old the plant must be I cannot say, but I can say that as soon as the flowers fade the plant begins to die and the huge stem dries out completely. The dead stem is brought to town and sawed into two-inch slices. This makes wonderful pin-cushions. Needles and pins remain ever bright and sharp in this convenient cushion.

After the stem dies, a new shoot from the root, which looks like a neighboring plant, grows with renewed vigor. There are often a dozen such plants in a clump on the hillside

OUR COMMON DANDELIONS

By Ernst A. Bessey

THIRTY years ago but one species of dandelion was common in the Northeastern quarter of our country, *Leontodon taraxacum,* as it was called by Linnaeus, or *Taraxacum officinale,* as many books still call it without regard to the undoubted priority of the Linnaean name. About fifteen years or more ago there began to be found the red-seeded dandelion. At first this was found only in a few spots and was a great rarity, but it has been spreading rapidly, until now it is quite common in many localities. Its name is *Leontodon erythrospermum,* or *Taraxacum erythrospermum* for those who deny to Linnaeus the right to use the name Leontodon, which means "lion's tooth," or "dent de lion" (corrupted in English to dandelion,) for the plants under consideration.

When the writer came to Michigan over twelve years ago the red-seeded dandelion was to be found in a few spots on the campus of the Michigan Agricultural College and only as a very rare plant elsewhere. In the years that have intervened since then it has been increasing in abundance not only at the College but elsewhere. It is now to be found in many localities in the Lower Peninsula and the writer has collected it at widely separated places, in the Upper Peninsula. It has beyond doubt come to stay.

One of the first things attempted was to see whether the two species can be distinguished before the seeds are mature. In general the red-seeded species is smaller than the other, and

the fruiting heads appear less dense and not so bright white; furthermore the flowering heads appear a brighter yellow in color. The leaves, too, seem to be more deeply incised. These differences, however, are soon found not to be constant. The common dandelion when crowded or on poor soil is often as small as its red-seeded relative, with as thin a head of fruits. The flower color as well as the degree of incision of the leaves are very variable. In fact, it is often impossible for the writer to distinguish a medium-sized common dandelion from a red-seeded specimen until the plants have mature fruit. Even the bract character used by Britton and Brown, the reflexed position of the outer bracts in the common dandelion and their spreading or ascending position in the other species absolutely fails in most cases. However, the large sized plants are invariably the common species.

It was soon noted that the red-seeded species ceased to flower as summer came on, so that the only dandelion in blossom at East Lansing after the middle of June were the other species. On the other hand the first to blossom were the red-seeded sort. During the latter half of May the two are both in full bloom. As the cool weather of Autumn comes on the red-seeded species again begins to bloom, being the last to show its flowers in that season. It is interesting to speculate upon the relation of the cooler weather to the blossoming of the red-seeded sort, as throwing light on the probable origin of the species. It seems that the species was first described from the cooler parts of the Russian Empire. The original home of the common dandelion is clouded in the mists of antiquity, and can perhaps never be found, so completely has it become a companion of man in his wanderings.

Michigan Agricultural College,
Department of Botany.

PRODUCING DISEASE RESISTANT PLANTS

By Casper L. Redfield.

A PLANT is an organism composed of many cells. In the growing part of the plant these cells are living things which have within them certain powers. A plant disease is a conflict, or the result produced when these living cells are attacked by parasites which are themselves living cells. If these parasites are sufficiently numerous, and have greater powers of attack than the plant cells have of defense, then the plant dies. If the parasites are not numerous, or have less powers than the cells of the plant have, then the plant is affected little or not at all by the attack.

Plants are of many kinds and diseases are of many kinds, but as we are not going into the technicalities of any particular disease, we will refer to plants and diseases in a generic way. A particular plant may have the power of resisting one disease and not the power of resisting another disease. In other words, disease resistance is specific, and the fact that a plant has the power of resisting one disease does not give it the power of resisting some other disease. Also, the power of resisting a particular disease is specific for the plant which has it. One plant of a variety may have such great power of resisting some particular disease that it is said to be immune, and another plant of the same variety may have so little power of resisting the same disease that it is said to have none at all.

These qualities of resistance and susceptibility are inherited qualities. The progeny of resistant plants are resis-

tant, and the progeny of susceptible plants are susceptible. What we have to consider here is the process of making susceptible plants resistant so that their descendants in later generations will also be resistant.

The power which a plant cell has of resisting the attack of some other cell (a disease germ) is developed in the same way that any other power is developed, and that is by exercising in a particular way the powers previously in existence. A man gets his muscles more powerful by exercising them, and in no other way. A plant gains in its power of resisting a particular disease by growing in the presence of and by fighting that disease, and in no other way. When plants of a non-resisting variety are grown on sick soil,—soil which is infected with disease germs,—some of them die and some survive to produce seeds. If seeds are taken from the survivors and again planted on sick soil, some resultant plants live and some die. After a few generations of this process, all of the plants left have powers of resisting the particular disease involved, and few or none die when raised in presence of that disease.

It is said that in this process the weaker plants are killed and the more resistant ones survive. This process is called "selection," and the theory of selection is based on the assumption that some of the plants of the "non-resisting" variety have more resistance than others. It is also based on certain other assumptions which we will consider later. But I think that before we get through, it will be seen that the selection theory in the production of disease resistance is an illusion, and that selection has nothing to do with the matter. Also, that the art of man is not capable of causing selection to have any part in the production of disease resistance.

For some months I have been in correspondence with a considerable number of Agricultural Experiment Stations on the question of producing disease resistant plants, and here I will refer to some of the experiments at two of these as being illustrative of points which I wish to call to the attention of readers.

At Pullman, Washington, Dr. E. F. Gaines has been experimenting on the production of disease resistance in a variety of plants. Referring to a variety of wheat he says that "selection within a pure line under conditions favoring maximum infection has not changed the resistance of a given variety during five generations." Speaking of another variety originating in a cross he says that "the immune selections have not changed in genetic characteristics during the seven generations that they have been grown in the smut nursery." Here we see that when other conditions remain constant, selection accomplishes nothing in the way of increasing the disease resistance of the plants being experimented upon.

At the Agricultural Experiment Station at Agricultural College, North Dakota, Professor H. L. Bolley planted one seed from a non-resisting variety of flax on soil which was slightly infected with wilt disease, but not infected enough to kill the plant. From the plant thus grown on slightly sick soil he took one seed which he planted on soil slightly more infected than the year previously. From this second plant he took one seed and planted it the third year on soil still more infected. And so on.

In regard to this process, Prof. Bolley says that he has "never been able to procure a full-fledged wilt-resisting plant from the first generation," but that after six or seven years of this procedure he has flax plants which will thrive on soil so heavily infected that the original stock "could not produce

a single plant to the acre." He also says "it is evident that the resisting ability increases from year to year, from generation to generation, even in a pure, pedigreed strain which came originally from a single non-resisting seed."

In this operation of producting fully resisting plants from non-resisting stock there is no trace of selection. There were no deaths of weaker plants and survival of more resistant ones. It is a plain case of resisting power increasing from generation to generation, and the thing to be considered is the source of that increase. The experiment just described is not affected in the least by the fact that Bolley carried on another experiment at the same time at another place on another plant. Neither would it be affected if he had carried on a thousand other experiments at a thousand other places. Nor would it be affected by any accident which happened to any one of such other experiments.

Flax is a self-fertilized plant not known to cross pollinate when left to itself. When the experimentor gets resistant plants from non-resistant stock, the pedigree of the resistant plants is that set forth in the experiment stated. Nothing in the way of improvement by selection would appear if he sowed a whole field with seeds instead of planting one seed and part of the resulting plants should die. The death of one plant does not add anything to the resisting power of a sister plant on the other side of the lot, and increased resisting power is the thing which was obtained.

There is a sharp distinction between the experiments referred to by Dr. Gaines and those carried out by Prof. Bolley. When a pure line is raised year after year under uniform disease infection, selection is powerless to bring about any improvement in disease resistance. When a pure line is raised year after year under gradually increasing infection, improved

disease resistance keeps pace with that increased infection without the use of selection.

When seeds from non-resistant plants are sown on disease infected soil, the fact that some die and others survive is not evidence that the survivors had greater inherent resistance than those which died. Soil which is supposed to be uniformly infected is in fact spotted. Disease producing bacteria are in colonies and are not uniformly distributed. Plants which fall on heavily infected spots are killed, while those on lightly infected spots survive. Under these conditions, some will live and some will die if they all have the same degree of resistance. Even when different seeds have inherent different degrees of resistance, the most resistant ones may die by reason of falling on heavily infected spots, and the least resistant ones may survive by reason of falling on lightly infected spots. The appearance which is called "selection" comes from different degrees of infection, and not from different degrees of resistance.

It may be assumed that uniform infection gradually intensified would result in selection in the strict meaning of the term, and that ordinary infection in a large field has parts which are near enough to the uniform to bring about that result. That this is not so may be seen by referring to the characteristics of living protoplasm wherever it has been found. One of the most fundamental of characteristics is that the powers of protoplasm increase when exercised, and that such development extends indefinitely under continually increasing exercise. While there is no known limit to the development of powers by exercise, the observed development is not uniform under uniform exercise. Rapid development, slow development, and apparrent cessation of development are interspersed along a period of activity. In studying mental de-

velopment under training, psychologists find times when training seems to produce no results, and they designate such pauses as "plateaux of learning."

Dallinger subjected little animals called flagellata to gradually increasing temperatures. Beginning with those living in water at 60 degrees, Fahr., he found that he could increase the temperature quite rapidly up to 73 degrees at which point he had to hold it stationary for two months before he could increase it further without killing them. Past this point he was able to increase the temperature rapidly again up to 78 degrees, at which point he had to hold it for eight months. He found several other sticking points on the way of getting them to live at 158 degrees, which point was reached in about six years.

Under continued training a horse will continue to gain in trotting power up to some point beyond 17 years of age, but not in every year of that time. Sometimes there will be a lapse of one year and sometimes a lapse of two years in which training appears to accomplish nothing, but if training be continued, rapid improvement comes on again. In different horses these sticking points come at different times in life. The same thing is found in milk production by cows. When regularly milked, production continues to increase up to 12 years of age, but not in every year of that time. As in horses, these sticking points come at different times in different cows.

By a great many tests of different kinds we find that powers in plants are developed the same as they are in animals, and that the development of disease-resisting powers comes under the same laws as the development of other powers. Applying these principles to the matter under consideration, it will be seen that in a field of plants growing under disease conditions, at any given moment some plants

are gaining rapidly, some plants are gaining slowly, and some plants are in a resting stage as far as the development of disease resistance is concerned. If the degree of infection be increased so that some but not all plants are killed, those that will be killed are those which happen at the time to be in a resting stage. As all plants, superior and inferior alike, have to go through resting stages at irregular intervals, it will be seen that causing such deaths is not a process of weeding out inferior ones.

Disease resistant plants have been produced under varying circumstances at different experiment stations, but the one circumstance which cannot be omitted is that they must be grown under disease conditions. A plant or an animal develops disease resisting power in fighting a disease, and disease resistance is a heritable thing. The obvious inference is that the acquired resistance is inherited. The stock argument against that is that disease kills the weaker plants and leaves the stronger, and that this selection brings about the improvement. It has just been shown that selection does not operate as it is assumed to operate, but the main argument against the selection theory is that killing a weak plant does not add to the strength of a strong plant, and the thing obtained is increase of disease-resisting power. No one has shown any process of increasing any power in any other way than by exercising the powers previously in existence.

PLANT NAMES AND THEIR MEANINGS—XVI
THE CRUCIFERAE

By Willard N. Clute

THE fifteen hundred or more species of Cruciferae form a very distinct and characteristic group. So nearly alike are the flowers of the different species, that the botanist finds them practically useless for classification and is obliged to resort in most cases to seed characteristics for a satisfactory differentiation of his specimens. The flowers are peculiar for having four instead of five parts in each whorl. The stamens however, are six in number and consist of two whorls, one of four and one of two stamens, the latter somewhat longer than the others. In the majority of the Cruciferae the petals spread out in the form of a cross and from this circumstance the family name, which means "cross-bearers," is derived. The species are commonly called cresses but contrary to the general assumption the word cress is not derived from cross. The family is occasionally known as the Brassicaceae, a name founded on the genus to which the cabbage belongs but Cruciferae is a very old name and almost universally used.

Nearly all the plants of this group are characterized by a pungent juice which has made them valued as pot-herbs or condiments. None of the species is poisonous but many are practically inedible because of an unsavory taste. The genus *Nasturtium*, to which the horse-radish belongs, is typical of these pungent herbs and is properly named from the Latin *nasus tortus* which is literally "nose twister." *Cardamine* is

a genus whose name is reputed to be that of some ancient species of cress known to Dioscorides, but Wood says the name comes from Greek words signifying "heart" and "to strengthen" in allusion to its *stomachic* properties. Here, indeed, the way to the heart appears to be through the stomach! St. Barbara is reputed to have discovered the medicinal vertues of the plants dedicated to her under the name of *Barbarea.* It may be that a certain amount of sanctity is required to perceive such healing virtues, for ordinary mortals confess that the plants have none, except that like many others they may be used as antiscorbutics. *Erysimum* is said by Gray to be from the Greek meaning "to draw blisters," but Wood, again, says the name means "to cure," in this being apparently willing to go a bit further than his contemporary in endorsing the virtues of the plants.

More important than any of the preceding in popular estimation are the plants in the genus *Alyssum* which are regarded as useful in the cure of hydrophobia. The generic name comes from a Greek plant once used against hydrophobia, according to Gray, but Wood says it comes from *a* privative and the Greek word for rage and that it was used to allay anger by the ancients. Since the plant will not cure hydrophobia it is fair to assume that Wood's derivation is the correct one though this may arouse anger in some quarters instead of allaying it. The name of *Draba,* given to the little whitlow grass, is said to mean acrid or biting and was originally applied by Dioscorides to some species of cress now unknown.

An unusual number of genera in this group have been named in honor of botanists and patrons of science. There is first the American moss student, Leo Lesqueraux, after which *Lesquerella* is named and also Dr. M. C. Leavenworth

a southern botanist who discovered the plants since called *Leavenworthia*. *Berteroa* is for Carlo Guiseppe Bertero a Piedmontese botanist, *Neslia* is named for J. A. N. de Nestle of Poitiers and *Comingia* is for Prof. H. Conring of Helmstedt. Count F. G. de Bray of Rouen is honored by *Braya*.

In contrast to generic names in other families, though quite natural under the circumstances, none of our cruiferous genera is named for the appearence of the flowers. The nearest we come to it is in *Hesperis*, the name of the dame's violet which means evening and alludes to the fact that the flowers give off their perfume then. There is also *Iodanthes* which is literally violet-colored flower.

Names referring to the seed-pods are numerous. Our familiar shepherd's purse has a generic name, *Capsella*, which is the diminutive of *capsa*, a box. Our word capsule comes from the same source. The flat pods of the plants in the genus *Thlaspi* account for this name from Greek meaning to crush. *Silenia* and *Lunaria* both refer to the moon, the first being from the Greek and the second the Latin. Here the round flat moonlike pods gave origin to the names. *Diplotaxis* is from the Greek and alludes to the two-ranked seeds and *Lepidium* means a little scale, which the small seed-pods resemble. Whether *Lobulus* meaning "a little lobe" refers to the "two-lobed hairs" is a question. It may have originally referred to the capsules which in so many species are lobed.

From the Arabic comes *Arabis* and *Cakile*. *Brassica* is the Latin name for the cabbage which is said to have been originally the Celtic *bressig*. *Sisymbrium* is an old Latin name for certain species of mustard and *Camelina* is the Greek for "dwarf flax" (*chamae-linum*). *Dentaria* is from the Latin *dens*, "a tooth." in reference to the toothed projections on the root-stocks of some species. *Coronopus* means

"crown" and "foot" and we expect to learn that it refers either to the flowers or the roots, but it is said to refer to the deeply cut leaves! The scientific name of the onion (*Allium*) is supposed to have given the generic name *Alliaria* to certain plants called garlic mustard in the vernacular. *Raphanus*, the name of radish, is from words meaning "quickly" and "to appear" which pretty accurately describes the behavior of this lively spring edible.

It is not surprising to find that the cress family was one of the first families to be recognized when the early scientists were arranging plants in groups. The flowers are all so much alike that even the novice perceives the relationship. Although the arrangement of the four petals in the form of a cross has given the name of Cruciferae or cross-bearers to the family, the word "cress," by which the species are commonly known, is much older. From the earliest times the name cress, or as it is often spelled in the language of northern Europe, cresse, krasse, cerse and kers, was the name of the plants belonging to the cabbage family. Incidentally it may be said that the phrase "not worth a curse" (kers), used to signify something of little value, was derived from the same word and originally carried no stronger implication.

Another ancient term applied to many species of Cruciferae is "rocket." This was originally derived from an edible species of the Old World, *Eruca sativa*, whose name the Italians corrupted to *ruchetta*, the French to *roquette*, and the English to *rocket*. The word "mustard" so commonly applied to members of this family comes from the name of new wine or "must." The seeds of various species were made into a condiment mixed with must, as we now use vinegar, and so derived the name of mustard.

With the explanations of the terms rocket, mustard and cress in mind, most of the names of the Cruciferae become intelligible. Indeed, the terms just mentioned are used in connection with so many plants in this family that the subjec of common names, in consequence, becomes quite monotonous. Beginning with the long line of cresses, we have first of all the species of *Arabis,* nearly all of which bear the name of "rock cress" from their preference for rocky places. *Arabis Canadensis,* however, though it lives on rocks, is generally called "sickle-pod" from the long, curving and conspicuous pods. *Arabis glabra* is the "tower mustard" or "tower cress" the name doubtless given because it grows on old towers in its native land though the name may refer to its own height in comparison with others of its genus.

Two genera divide the honors as regards the designation of the true cresses. One is the genus *Nasturtium* which in recent years has been occasionally known as *Radicula* or *Roripa.* To this genus, whatever it may be called, belongs the true "water-cress" (*Nasturtium officinale*). Among its other names are "well cress," "water grass," "crashes," "brown cress" and "brooklime." The last mentioned name means simply water plant;" the others are self-explanatory. *Nasturtium sylvestris* is the "yellow cress" or yellow water-cress" from the color of its flowers and "wood cress," a translation of its specific name. The "lake cress," "river cress" or "lake water-cress" is *Nasturtium lacustre.* Another "yellow water-cress" is *N. palustris* which is more properly "marsh cress" if its specific name means anything. The plant is also known as the "yellow wood-cress." To the *Nasturtium* genus also belongs the familiar "horse radish" (*N. Amoracia*) whose name alludes to the pungency of its root and not to the animal suggested. In this and so many

other common names, horse simply signifies big or strong.

The second cress genus is *Lepidium* which contains the "garden cress" (*L. sativum*). This plant, like the water-cress, is of European origin; in fact, of our ninety-two species of Cruciferae, just about half are immigrants. The species just mentioned is occasionally called "golden cress," and "golden pepper-grass," the last term referring to its pungent qualities. "Tongue grass" may have been suggested by the same characteristic. It may be noted in passing that "grass" frequently used in connection with the cresses, is probably a mispronunciation of the word cress. One of the commonest of our weeds is *Lepidium Virginicum* which is known as "wild pepper-grass" and "tongue grass." Cage birds are fond of its seeds hence such terms as "bird's pepper." "bird-seed," and "chickweed." Several other species in this genus are called "pepper-grass." *Lepidium* campestre, is, as the specific name indicates, the "field cress." It is also known as "pepper-grass," English pepper-grass," "poor man's pepper" and "glen pepper." Like some of its congeners it is "yellow-seed." It is also known as "cow-cress," "crow-weed" and "false flax" for no very obvious reason. The name of "Mithridate mustard" sometimes applied to this species belongs more properly to another cress *Thlaspi arvensis*. *Coronopus procumbens* is the "carpet cress," or "herb ivy" from its creeping habit but it is more commonly known as "wart cress," "wart-wort," "sow's grass," "swine's cress" or "buck's horn." All these are Old World names probably originally referring to some fancied use of the plant in curing warts and of no particular significance at present. The plants best entitled to bear the name of "false flax" are the species of *Camelina* for the common name is a literal translation of the scientific one. *Camelina sativa* is also known as "Dutch flax" in allusion to

its flaxlike leaves. The plant is also called "gold-of-pleasure" in reference to the yellow flowers but "oil-seed" and "Siberian oil-seed" have been inspired by more utilitarian qualities. "Madwort," sometimes heard is due to a confusion of this plant with species of *Alyssum* which, in a way, it resembles.

Another group of cresses are those belonging to the genus *Cardamine*. One of the most attractive plants of early spring is *Cardamine bulbosa* the "spring cress," per excellence. A species of similar appearance is *C. Douglasii* known as "purple cress" and "mountain water-cress." *Cardamine rotundifolia* is another "mountain water-cress" and is also called "American water-cress" and round-leaved water-cress." *Cardamine bellidifolia* is the "alpine cress" and *C. hirsuta* is the "bitter cress," "land cress" and lamb's cress." The last name is evidently derived from the one that precedes it and this in turn from the fact that the plant does not favor places as moist as the majority of the species require. An allied species, *C. pratensis*, is also called "bitter cress" but it has many other names among which are "meadow cress," derived from its specific name, and "milkmaid," and "May-flower" from its color and time of bloom. The plant is, however, generally called "cuckoo flower" but Shakespeare's cuckoo flowers was of a different color and is perhaps the marsh marigold (*Caltha*). Our plant, however, is certainly that "lady's smock" to which the poet alludes in the lines.

"When daisies pied, and violets blue,
And lady-smocks all silvery white
And cuckoo-buds of yellow hue
Do paint the meadows with delight"

BLUE DANDELIONS

By Norman Jefferies

BOTANICAL scientists and amateur lovers of wild flowers will thrill in unison at the announcement in an authoritative journal heralding the discovery of an entirely new variety of a species whose type representative is, perhaps, more familiar to even casual observers than any other of our common flowers of roadsides and fields.

Proclaiming in a recent issue the discovery after a nine years' search of what is proudly described by its fortunate finder as "the fabulous blue dandelion" the editor of the *Atlantic Monthly* in personal response to inquiries not only offers practical substantiation but assumes individual responsibility for the authenticity of the new variety.

Those who study and collect our native and introduced species of wild flowers will understand the motive of the writer in seeking to secure from the *Atlantic* editor details in verification of the most remarkable botanical find of the century. Properly jubilant over the discovery of a new variety hitherto overlooked by scientific and amateur students, the editor promptly furnished what he regarded as proof positive, or, as he puts it, "the credence of his own senses." To which he add "he has seen dandelion before—a good many of them —and that this is a blue one he can swear most positively." Which coming from the editor of that sacrosant repository of all learning, the *Atlantic Monthly*, should convince and doubtful inquirer.

The honor of the discovery belongs to Mr. Roger Sherman Hoar, an authority on constitutional law, who in the summer of 1913, was accidently confronted by the first blue dandelion of which it is recorded that mortal eyes ever looked upon. Withholding tidings of his treasure trove until he could startle botanists all over the world by presentation of specimens raised by himself, Mr. Hoar carefully preserved and planted the seeds. But to use his own words: "the next summer neither the seed nor the orginal plant came up and the blue dandelion was lost to the world."

Disappointed but not discouraged, Mr. Hoar with the true spirit of scientific investigation, did not relax his pursuit until, in three widely separated parts of the country, he had found other specimens of the blue dandelion. His account of the extraordinary discovery was then submitted to the *Atlantic Monthly* but was not given to the world until the editor, realizing the great importance of the subject, employed what appeared to him to be the best method of convincing himself of the existance of blue dandelions. And in a letter to me he declares he "has both seen and handled them."

As Mr. Hoar, warned by his first experience, has now taken all necessary precautions to ensure successful propagation, there should be available now a quantity of seed for presentation to eager amateur and scientific wild flower collectors. Those who are interested are advised to write the editor of the *Atlantic Monthly,* Boston, Mass.

BOTANY FOR BEGINNERS—VII

By Willard N. Clute.

WHEN the beginner takes up a scientific key, it is enough for him if he is able to trace his plants correctly. He rarely bothers about how the key is constructed or what characters the maker seized upon to break up the world of plants into smaller and more manageable groups. As a matter of fact, it is of little consequence what distinctions are used, provided always that they unerringly refer each species to its proper group. In a key to the common lobelias, for instance, it would be quite sufficient to use "flower scarlet" to distinguish the cardinal flower from its relatives, but the same distinction could not be made among the violets because there are no red species. Nor would such a division answer for large groups since it would place entirely unrelated forms together.

In selecting distinguishing features for their groups, the key-makers pretty generally adopt such marks as will place related plants together, but the trouble is to hit upon characters that will indicate relationship. To group together all plants possessing palmate leaves would be a mistake, for single plants in any natural group may possess such leaves. Characters taken from the flowers, however, are more certain. It is a commonplace to say that entire families have the same type of flower. We see this in the mints, lilies, roses, peas and mustard families, to mention only a few; we therefore find the main divisions of the keys depending on some character of the flower.

Upon examining a number of flowers, we find that they fall into two well-defined groups according to the number of the parts in each floral set. The numbers are three, four and five. The number of parts might seem to be an unstable thing to base a division upon, but the fact is that these numbers are practically unvarying in each kind of flower, and that other characteristics, as well marked, accompany them. For instance, the three-parted flowers have a single seed-leaf, scattered vascular bundles, and parallel-veined leaves, while the others have two seed leaves, bundles in circles, and net-veined leaves. Such a distinction, therefore will divide the flowering plants into two distinct groups, which are commonly called monocots and dicots according to the number of seed leaves they possess. Probably all can look back to their early days of botanizing and recall how carefully they read the distinctions between monocots and dicots in their key, and how after a few weeks of such investigations they recognized the differences at sight and started with the group to which the specimen in hand belonged. Older students naturally recognize lesser groups in the same way and begin still farther along in the key.

A favorite distinction depended upon to separate the large plant groups into smaller ones, is the nature of the corolla. In some plants the petals are united into a saucer, tube or cup, while in others they are entirely separate and free. The ovary also offers easily recognized distinctions, sometimes being borne within the flower and sometimes appearing to grow below it. The important fact is, that following such divisions we find our groups essentially alike. The flowers often become irregular by having some petals of different size from the others, and these latter almost invariably have the habit of turning sidewise. Their stamens are also great-

ly reduced in number, often only one to a flower. By the time we have used these distinctions for breaking up large groups into smaller ones, we find that the plants in each division begin to have recognizable resemblances and from this point on the key-maker selects anything that will serve his purpose for further segregations. Among other things, the number and position of the stamens, the number of carpels, the position of the leaves on the stem, the number of seeds, the color of the flowers, and the shape of the leaves are favorite characteristics.

The final arrangement of all these groups is as near as a linear sequence as it can be made, but since evolution has produced types of many kinds, such a sequence is but an approximation. It is the custom to place the monocots first and the simplest dicots next to them, though it is now known that monocots as a group are more complex that these latter plants. In deciding what are or are not simple types of plants the flowers are again considered. Those with separate petals or none at all, with many stamens and carpels, with regular flowers and superior ovaries are regarded as simple types, while the highest have united petals, few stamens and carpels, irregular flowers and inferior ovaries. According to this the dandelion is one of the highest types. Consult almost any kind of a key and the dandelion will be found to end the list.

The main difference between a scientific key and one that arranges plants according to color, or habitat, or time of flowering, is that the scientific key is more exact and invariably groups related plants together. When one traces his plant by a scientific key he steadily moves toward that part of it in which all the plant's allies are found, and is helped in his progress by the opportunity to compare his specimen with its relatives. By so doing, he gains much more than the name

of his plant; he also gets a working knowledge of the structure and relationship of the whole plant world and acquires the ability of identifying unknown species with rapidity and ease.

THE LIFE OF A BOOK

A book is in many ways like a plant. It appears, fresh and vigorous runs through a life-cycle of varying length and finally dies and disappears or perchance becomes a fossil on the shelves of the second-hand dealer. One unaccustomed to the methods of publishers is apt to regard a book somewhat as he does a loaf of bread, to be had at almost any time and anywhere upon demand, but books are not produced in that way. They appear in editions which might be likened to a crop of plants. A book-crop may yield 500 or 1000 volumes and when these are used up no more are commonly to be had. The book turns out to be an annual and the publisher usually declines to sow another crop of the same kind by bringing out a new edition.

Occasionally a book takes with the public and becomes a perennial. Edition after edition is demanded but just how rarely this is the case with scientific books one may discover for himself by looking for second editions among the books on his own shelves. There are, however, even a few century-plants among the books. The dictionary is a good illustration. The old editions die, but new ones constantly spring up from the parent stock.

The evanscent character of most books, therefore, makes it desirable for one who decides to buy a particular example to get it at once, otherwise he may never possess it or if by chance he does secure it, he may be obliged to take a second-hand copy often at a large increase in price.

The great war made the book situation still more serious by doubling and trebling the cost of everything that goes to the making of books. In consequence the publisher can no longer take a chance on a small edition of a new book. A failure costs too much. He must now be assured in advance that a work offered for publication will sell into the thousands. The decision as to what is or what is not a good book is thus shifted from the public to the publisher who is as likely to guess wrong as right, and so suppress many worthy manuscripts. Moreover, high costs require that stocks be turned over quickly. A really valuable book may sell so slowly that a new edition is unprofitable and it is regretfully allowed to go out of print. Practically the only exception to this rule are school-books which, being bought in larger quantities usually have a longer run.

Twenty years ago, there was a lively interest in nature and nature-books, but the moving pictures have largely taken the place of reading and the automobile has made botanical excursions quite plebeian. The old-fashioned individual who still finds entertainment in field and forest is likely to be astonished when he inquires for the books relating to botany that he used to know. Nearly all have disappeared. Mrs. Dana's "According to Season," Mrs. Creevey's "Recreations in Botany," Going's "With the Wildflowers," Henshaw's "Mountain Wildflowers," Lounsberry's "Guide to the Wildflowers," Gibson's "Blossom Hosts and Insect Guests" and a host of other "how-to-know" books have gone out of print. Even Britton's "Manual" has gone the way of all things and Underwood's "Our Native Ferns and their Allies"—the latter after running through six editions. In fact there has been a great mortality among fern-books. Waters' "Ferns," Beecroft's "Who's Who among the Ferns," Eastman's "New

England Ferns," Dodge's "Ferns and Fern-allies of New England," Slosson's "How Ferns Grow," Woolson's "Ferns," and Price's "Fern Collectors Handbook" all well known a dozen years ago have disappeared. Indeed, the only books in this class left are Parson's "How to Know the Ferns" ($2.50), Tilton's "Fern Lovers' Companion" ($3), Clute's "Our Ferns in their Haunts" ($3) and "Fern Collectors' Guide" ($1).

Not only has the mortality among the older books been great, but few new ones have arisen to take their places. Among popular handbooks, however, we still have Dana's "How to know the Wildflowers" ($3), Lounsberry's "Southern Wildflowers and Trees" ($5), Peterson's "How to know Wild Fruits" ($2), Mathews' "Field-book of American Wildflowers" ($3.50), and Armstrong's "Western Wildflowers" ($3.50). Somewhat similar in nature are Chase's "First book of Grasses" ($1.25), Georgia's "Manual of Weeds" ($3), Hichcock's "Grasses" ($2), and Dunham's "How to know the Mosses" ($2.50).

Among Manuals there is still left that standard work Gray's "Manual," 7th edition ($3), though we still regret the passing of Wood's "Class-book." Small's "Southern Flora" ($4) is standard for the Gulf States and Coulter & Nelson's "Rocky Mountain Botany" ($2.60) for the mountain States. Gray's "School and Field Botany" ($1.88) is valuable for the number of cultivated plants it includes and Wood's "Botanist and Florist" ($2) now nearly out of print is much like it. Though Britton's Manual is out of print, his "Illustrated Flora" in 3 volumes ($13.50) which figures all the plants of eastern America is still on the market.

Books devoted to trees and shrubs are still plentiful. Emerson and Weed's "Our Trees; How to know Them"

($3.50), is one of the best for beginners, and Lounsberry's "Guide to the Trees" ($3) is another. Keeler's "Our Northern Shrubs" ($3) and "Our Northern Trees" ($3) are also excellent. Apgar's "Shrubs of the United States" ($1.60) includes cultivated as well as wild species and Trelease's "Winter Botany" ($1.25) and "Materials for Decorative Gardening" ($1.25) include the trees as well. Blakeslee and Jarvis' "Trees in Winter" ($3.50) is good for winter botanizing.

For those interested in economic botany, Sargent's "Plants and their Uses" ($1.60) and Saunders' "Useful Wild Plants of the United States" ($3.50) are recommended. To these may be added Harshberger's "Pastoral and Agricultural Botany" ($2), and Robbins' "Botany of Crop Plants" ($2.25). Sturtevant's magnificent volume entitled "Notes on Edible Plants" is the last word in this line. It is published by the State of New York. Lovell's "Flower and the Bee" ($2) may be added for those interested in pollination. For the myths and legends connected with the plants one should consult Beal's "Flower-lore and Legend" ($1.40) and Skinner's "Myths of Flowers, Fruits and Plants" ($1.50).

The standard dictionary of plant terms is Jackson's "Dictionary of Botanical Terms" ($3.50) though Henderson's book of the same name ($4.50) has various features to recommend it. Zimmer's book, also with the same title ($2) is a good but cheaper book and Harvey-Gibson's "British Plant Names and their Derivations" ($1) and Lindsay's "Plant Names" ($1.25) are desirable.

Garden books, possessing somewhat more of a utilitarian character, are rather more numerous than other plant books. Their contents are naturally varied and it is difficult to make a representative selection. Three that may be recommended

for the flower-gardener are Keeler's "Our Garden Flowers" ($3), Saylor's "Book of Annuals" ($1.20) and McSelf's "Hardy Perennials" ($2.75). Sedgewick's "Garden Month by Month" ($7.50) is a very comprehensive work and Thomas' "Book of Hardy Flowers" is the most comprehensive we have seen but unfortunately this last is now out of print.

Many of the books mentioned in the foregoing have been on the market so long that it is likely that they are fast nearing extinction. All were in print, however, as this was written. Before another gardening and botanizing season occurs, it is probable that several of these will be no more. Those who have planned to own copies of them, should lose no time about it.

THE LARGEST FLOWER IN THE WORLD

By H. E. Zimmerman.

CAN you imagine a blossom as large as a carriage wheel? On the island of Mindanao, one of the Philippine group, such a flower was found by some explorers some years ago. Far up on the mountains of Parag, 2500 feet above sea level, they were wandering when they came across some buds larger than gigantic cabbage heads. Greatly astonished, they searched further, and presently discovered a full-blown blossom, 5-petaled, and 3 feet in diameter. It was carried on low-lying, luxuriant vines. The natives call it "Bolo." It was impossible to preserve it fresh, so the discoverers photographed it and kept a few of the petals to press. A single flower weighed 22 pounds. It was afterwards found to be a species of *Rafflesia*, first found in Sumatra and named after Sir

Stamford Raffles. The new flower was called *Rafflesia Schadenbergii,* in honor of its dicoverer, Dr. Schadenberg.

The immense flower is composed of five round petals of reddish green color, each measuring a foot across. These are covered with numerouse irregular yellowish-white swellings. The reflexed petals surround a cup nearly a foot wide, the margin of which bears the stamens. The cup of the *Rafflesia* is filled with a fleshy disk, the upper surface of which is covered with projections like miniature cow horns. When free from its contents the cup will hold about twelve pints of fluid. The flower is very thick, the petals being three-quarters of an inch in thickness. Its striking beauty is spoiled by its intolerable odor which pollutes the air for many feet around it. It is also a parasite, growing on the trailing vines which are found in great abundance in tropical forests.

OUR NATIVE CYCAS

By Mrs. W. D. Diddell.

MOST people are probably familiar with the so-called sago palm (*Cycas revoluta*) but less well known is our native Cycas, the *Zamia integrifolia,* or coontie, of the Seminole Indians. The Cycadaceae is a most interesting family, the plants having stems and leaves like a palm but coiled in the bud like a fern. It has the flowers and fruits of the pine family and might be said to be the connecting link between the pines and the palms.

The *Zamia* or coontie is found in South Florida and is the only Cycas native to our Southeasetern States and so far as I know of the whole United States. It grows in low moist lands and is found extensively in the everglades where the

root which contains much starch is esteemed as an article of diet by the Seminole Indians. The short stem is underground so that the leaves come up on long petioles. The leaves are close-set and numerous giving the plant a bushy appearance much like that of the cinnamon fern which it also resembles in height though it is much heavier appearing owing to the greater number of leaves.

The coontie is dioecious and the sterile aments of the male plant resemble far more the staminate aments of the pine trees than they do the pineapple-cheese-like sterile cone of the sago palm. They are about four or five inches in length on short peduncles and are hidden down under the leaves. The large cone of fertile flowers, also hidden among the leaves, is not much larger than a large pine-cone but unlike it and very heavy. It is composed of large hexagonal scales, dark brown in color, connected by a long filament with the central rachis.

The irregularly shaped fruits are packed under the scales around the rachis far more tightly than the proverbial sardines in a box. The fruits, flattened on the sides where they lie together, and deeply grooved where they overlap the filament connecting scale and rachis, consist of a round seed with a hard outer covering surrounded by thick albumen.

This interesting plant is cultivated throughout Florida as an ornamental though the farther north one goes in the State the less it is seen. Owing to the quantity and excellent quality of the starch to be obtained from the stem, it should be of value commercially but like a great many other plants of economic value it is neglected because none take the trouble to exploit it.

NOTE *and* COMMENT

Abnormal Growth of Poison Ivy.—One normally expects the poison ivy (*Rhus radicans*) in the northern part of Michigan to occur as a small shrubby plant, seldom exceeding a foot in height. The climbing form is apparently absent. The nearest approach to it was discovered on July 28, 1922 along an open roadway close to Temperance Point at the extreme northwestern part of the lower peninsula. Here on the sandy ridges bordering Lake Michigan there are many of the ordinary shrubby plants of *Rhus*, but in one place along a roadway three plants had started to grow the long stem; differing, however, from normal in that this stem went thru vegetation rather than climbing up it. There were trees of white cedar (*Thuja occidentalis*) available, but, altho one passed a trunk of *Thuja* and had aerial roots attached to it, the direction of growth was paralled with the ground. Continuing thru a thicket of *Thuja* seedlings these stems of *Rhus* remained approximately in the centers of the plants out to the edge of the thicket. There the stem dropt to the surface of the ground and proceeded. In so doing, it grew thru a meadow and out into a boggy beach pool where *Rynchospora* was particularly abundant. At the time of observation the outermost part of the plant was actually on water soaked ground, altho at no place underneath the surface of the water. Apparently, however, it was growing with normal vigor and ordinary leaves and flowers

were spread along it in the usual manner that they would be on an upright stem. The evidence seemed to be that it was an ordinary aboveground stem rather than an underground stem and yet it might have been that the very wet soil in the vicinity had forced the plant to develop its rhizome out in the air.—*Frank C. Gates.*

Large Elder-berry Fruits.—Among the new plants imported by the Government for distribution to experimenters, are specimens of the common European elder-berry (*Sambucus nigra*) with fruits three or four times the size of ordinary elder-berries and very sweet and juicy. When ripe they are greenish-golden instead of blue-black. The discoverer of this sport gathered twenty-one pounds of fruit from a specimen the second time it fruited. It is probable that all of our wild fruits could be improved greatly by selection and cultivation if desired. The common wild cherry (*Prunus serotina*) has thus been made into an edible form in parts of the tropics. In the case of our native elder-berry (*Sambucus Canadensis*) nobody seems to have thought it worth experimenting with, but all wayfarers know that the fruit presents a wide degree of variation and therefore offers many points of departure for making improved varieties. All that is needed to produce a commercially valuable fruit is somebody with time and patience enough to carry out the work.

Vegetable Brooms.—A year or so ago, the writer of this paragraph picked up in one of the cliff-ruins of our Southwest, a broom made of the stem and leaves of a yucca plant. The specimen had laid there for possibly a thousand years since it dropped from the hands of its Indian owner. The broom is no modern invention, but long before there were manufactured brooms, the savages utilized various plants for cleaning up as we now use the manufactured article. Those

who lived where brooms grew ready to hand were, however, more fortunate than the others. A modern vegetable broom has recently been reported from Japan. It is said that in that country our common "standing cypress" "burning bush" or World's Fair plant" (*Kochia scoparia*), or a plant so much like it that passes under its name, has branches so tough and resistent that after they have served their time as ornamental plants they are pulled up and employed for more useful purposes.

The Butterworts—A plant sent for name by a reader in South Carolina proves to be *Pinguicula elatior* a cousin of the plant of North America and Europe known as the butterwort or bog violet (*P. vulgaris*). The Carolina plant is also well entitled to the name of bog violet since its flowers are the size and color of violets, are turned sidewise on the stem, and posses a spur projecting backward. The spur, by the way, is rather slender and pointed and reminds one of the long-spurred violet (*V. rostrata*) more than it does the other species. The leaves of all the pinguiculas are greasy to the touch and many small insects become mired in the excretion which is supposed to digest them for the use of the plant. A yellow-flowered species common on the Gulf Coast, and there known as buttercup, is an expert insect-catcher but its flower-stalks are so greasy as to make them unfit for bouquets. *Pinguicula vulgaris* is spread irregularly across the northern hemisphere and becomes rare southward, but in the latter region it is well represented by four other members of its tribe.

Japanese Water-plant.—Whenever one has new swindle to put over, he always gives his project some impressive name. A few years ago, there was an epidemic of Japanese air plants which were not plants at all, but colonies of

a small water animal which had been dyed green to resemble a plant. Now comes the Japanese water plant which is described as a triumph of plant life that requires nothing but water and sunshine for growth. A small packet of seeds is offered for 25 cents and guaranteed to produce "an ideal fern for the table." The seeds, however, are those of the edible lentil which can be purchased of the grocer for less than 25 cents a quart, but those who like to be humbugged will probably perfer the neat little packet and consider the fairy story that comes with it, worth the price.

Sterility in Lilies.—Those who cultivate the lilies know that these plants seldom produce seeds. It is not too much to say that the seeds of some kinds have never been seen. It was the opinion of Darwin and other early botanists that the production of bulbs and bulblets in these species in a measure compensated for the lack of seeds. Others assumed that the lack of seeds is to be attributed to the exhaustion of the plant's energy in producing bulbs. Some time ago, A. B. Stout made some investigations of the subject and concluded that both opinions are erroneous and that lilies do not produce seed-pods for the simple reason that their own pollen and frequently the pollen of closely related individuals is impotent on their own stigmas. Lilies are capable of producing abundant seeds when properly pollinated and will usually do so when pollinated with pollen from entirely different species. There are many other plants whose sporophylls present similar conditions. Some plums, pears, and apples are self sterile. Though such difficulties of pollination have long been known to exist, nobody has suggested any reason for the curious fact that after a species has originated, some defect in its pollinating mechanism renders it likely to disappearance through failure to reproduce itself. The production of bulb-

lets, which are essentially detached buds capable of growth into new plants may, after all, be one way in which the species defends itself from extinction.

Gardening in One's shoes.—A good many people, without knowing it, maintain a considerable garden in their shoes. Certain tiny plants which thrive in warm, moist places may multiply there and in time make their presence known by odors that are far from pleasing. Scrupulous cleanliness is often counted on to keep one free of such pests, but he may become infected again and again, especially if he patronizes a cobbler. Even trying on a pair of new shoes that have been tried on by someone else may produce trouble. People who wish to be rid of such gardens are often advised to bathe the feet in water containing a small amount of formaldehyde, but a much better scheme is to shake into the offending shoes, a little powdered boric acid now and then. The acid may be obtained at any drug store and is absolutely harmless—except to the pesiferous plants. Copper sulphate or even ordinary sulphur may be used but these may cause stains on light shoes while boric acid will not.

Lichens.—No climate is too wet, too dry, too hot or too cold for lichens of some kind to flourish. The talus blocks of rhyolite exposed to the cloudless glare of the sun in a region with an annual rainfall of no more than eight inches are covered with drouth resistant lichens as closely aggregated as they can crowd, while the desert below sea-level, with a rainfall of less than two inches has a plenitude of rock and earth lichens which thrive in the heat as great as the earth affords. On the other hand, the pinnacles of the great Puget Sound volcanoes or the sky-splitting peaks of the Alps are thickly crusted with layers of dark lichens or swathed in leathery blizzard-defying *Gyrophoras*. From the

farthest north lands seen by Peary in his trip to the pole a bit of rock was sent me on which the lichens left no unexposed surface, while on many seashores, rocks submerged at every tide are equally well-covered by these strange plants. The lace lichen, (*Ramalina reticulata*) largest and bulkiest of North American lichens reaches its maximum development with a rainfall of about sixteen inches, while in the forests of the outer coast range of Oregon or the mountains of Java, where the rainfall is measured with a yardstick, *Usnea longissima* justifies its name, attaining at times a length of 10 meters (thirty-two feet.)—*Albert W. C. T. Herre in Scientific Monthly.*

Range of Magnolias.—The species of *Magnolia* are regarded as decidedly Southern in distribution. The closely related tulip tree (*Liriodendron tulipifera*) pushes northward into southern Michigan and the cucumber tree (*Magnolia acuminata*) is reported in the books to range from New York to Illinois and southward. Although the natural range may be as indicated, it by no means indicated the area in which species of *Magnolia* are hardy. The umbrella tree (*Magnolia tripetala*) which in nature ranges no further north than the Ohio river, thrives in Joliet's Arboretum in Northern Illinois and this year produced several blossoms. The writer of this paragraph recently noticed a fine old specimen of *Magnolia acuminata* at Whitehall, Michigan, which is well north in the State and more than a hundred miles beyond its natural habitat.

Phlox stellaria.—In reply to the query regarding the habitat of *Phlox stellaria*, Dr. Frank T. McFarland writes: "About ten years ago I made several trips along the Kentucky river and I ran across a phlox which I identified more or less doubtfully as belonging to this species. I paid no further at-

tention to the identification until the 17th of May of this year when Doctor Wherry from Washington was here looking for the same plant. We made the trip to Camp Nelson where we found it again. In the opinion of Doctor Wherry this plant is undoubtedly the true species." This at least gives one definite location for the plant. All the others in which it is reported to grow, either show no trace of it or the plants seem more properly referred to *Phlox bifida.*

Yucca.—In Florida the yucca is known as Spanish bayonet. At St. Augustine they have huge old plants, very tall, to guard the gates of the city, and in the northern part of the State you see them occasionally. The species was probably introduced into Florida by the early Spanish settlers as we had several at our home, St. Nicholas, formerly an old Spanish fort across the river from Jacksonville. In Arizona the yucca is often known as "amole." In this species the plants are low and the foliage dull colored and hairy, but the flower stem is the same—very long and covered with dozens of white waxen lily-like flowers and followed by large and curious seed-pods. Here the plant is used in the manufacture of soaps and washing-powder for the head. I do not think the root is edible or the Mexicans would make use of it for that purpose.—*Mrs. O. A. Budd, Prescott, Ariz.*

Tradescantia.—The Tradescantia is also known as spider-wort, Job's tears and widow's tears, from the three petals dissolving into a jelly-like "tear-drop," after having been in bloom but a day. The varieties found here (northeast Texas) are low-growing and thick-stemmed, producing large heads of bloom. I recently counted sixty-five buds on a single stalk. I have never seen them advertised in catalogs in any colors but blue and white, but here we find blue, purple-blue, and the softest shades of rose and lilac, but no white.

The foliage is grass-like, dark green and somewhat rough.—*Florence Hartman Townsend, Rockwell, Texas.*

Back Numbers Wanted.—The State Normal School of Peru, Nebraska, needs No. 1 of Volume 25, No. 3 of Vol. 26, and No. 2 of Vol. 27, this magazine, for completing their volumes. Any reader who does not care to preserve his copies will do a favor by forwarding the desired numbers to the school. Our supply was exhausted long ago; in fact we print so few extras that each issue is soon out of print. We have only 14 sets of the first 25 volumes remaining and the price has advanced to $20 a set. The four additional volumes, bringing the set up to date cost $6. There are ten sets of the first 22 volumes at $15 and this is the extent of our supply. It is the part of wisdom to order at once.

EDITORIAL

It is a long way yet to winter and the end of all ordinary botanizing, but the time when we begin to withdraw indoors and give more attention to books and writing is not so far away. Now, therefore, is the time to set down in permanent form an account of the season's experiences. A good many people who read this statement may be inclined to think that they have no botanical experiences worth recording but this is probably incorrect. If you have seen no plant or flower under conditions that made you exclaim over it, if there have been no occasions when the presence of flowers have added to your enjoyment, if you have found no flowers new to you nor met with familiar flowers in new habitats, if you have not been impresed with new beauties in some common species, then you may perhaps be justified in asserting that you have nothing to write about. Still, good botanical writing does not consist entirely or even chiefly of descriptions. It deals more with ideas and impressions. It is a failing of the novice to think that plants must be described in technical language. He may be interested merely in the brilliancy of a certain flower, but he thinks it necessary to mention the linear-lanceolate, dentate, apiculate, chartaceous and pubescent leaves and may even extend his technical remarks to the flowers themselves. But that is not the way we describe a new flower to our neighbor over the back fence and it is not the way to describe it in print unless some question of its exact specific or generic relationship is up. Nor are articles which are largely

catalogs of names desirable. In describing the flora of a region, to be sure, all the plants may be listed, but when we return from a trip and attempt to give a friend some idea of the flowers encountered, we do not enumerate them all; we only name the outstanding forms which especially attracted our attention and add the reasons why they did so. Something of the same treatment should prevail in our printed accounts. If one examines the writings of Burroughs, Thoreau, Gibson, Van Dyke, Hudson, and others of similar character, to discover what it is that gives permanence to their work, he discovers that aside from the ability to express themselves in pleasing form, it is the ideas they present that attract us. One may conceivably stay at home throughout the year and yet gather a harvest of ideas that will provide a better article than extensive botanizing. We do not, however, mean to imply that descriptive articles are not desirable, but we do suggest that ideas may also be included. Every year we have to return to the writers numerous articles that are too categorical or too descriptive of well known features to suit us, but we have never yet returned an article with ideas in it. And so, just now when we assume that all our readers are planning to send us the results of their season's work, we print these friendly admonitions.

BOOKS AND WRITERS

Well, here we are, back from a month's vacation, to find that the publishers have seized the opportunity to make a lot of changes. * * * After completing 37 volumes, *Horticulture* of Boston ceases to be a trade paper * * * It has been promoted to be a general horticultural magazine under the auspices of the Massachusetts Horticultural Society

* * * The name it has so long and honorably borne will be retained. * * * It is no reflection on the Society to say that they will have to step lively if they improve the pace it has set. * * * It is our favorite trade paper. * * * One of the literary magazines recently announced the demise of the *Guide to Nature*, but the irrepressible Bigelow says the report is greatly exaggerated. * * * There was a fire in the office, recently but the *Guide* is a regular phoenix. * * * "There was never a brighter outlook than at present," says Bigelow. * * * The *Writers' Monthly* of Springfield, Mass. has enlarged again, adopted a different type-face and made two columns to the page. * * * This is the only writers' magazine that we would subscribe for if we did not get it in exchange. * * * Even the botanically-minded will find it of interest. * * * The "Official Catalogue of Standardized Plant Names" which has been in preparation for a number of years is announced as on the eve of publication. * * * Harlan P. Kelsey, Salem, Mass., has charge of the sales. * * * Five dollars a copy and probably worth it. * * * We shall say more about that when we have seen a copy. * * * A new edition of the "Fern Lovers' Companion" or rather the original edition with a few changes made by the new publishers is now on the market. * * * Little, Brown & Co., have the book. * * * The price has been increased to $3. * * * A new jacket, with a complimentary notice by the Reviewer gives it a certain *eclat*—if you know what that means. * * * The first number of a new Polish botanical publication has found its way across the Atlantic. * * * Its full title is "Acta Societatis Botanicorum Poloniae" and it is published at Warsaw. * * * The first number is very well arranged. * * * A number of the articles it contains are written in

French and the others have a summary in that language. * * * Walter Stager whose iris book has been favorably received by the public has reissued a small pamphlet on "Hardy Flowering Shrubs." * * * It tells what kind to plant and how to care of them. * * * Dr. E. B. Payson has issued another monograph of western plants. * * * This time it is Thelypodium and its immediate allies. * * * Dr. Will Sayer Moffatt has distributed Part 2 of the "Higher Fungi of the Chicago region." * * * It includes the geasters and puff-balls and illustrates most of the species. * * * Of the giant puff-ball, which he calls *Calvatia borista* he says "No specimen of unusual size has been reported from the vicinity of Chicago." * * * Well, it all depends upon one's idea of size. * * * A specimen sixty-nine inches in circumference from this region was figured in *American Botanist* for January 1906. * * * We always thought that was some puff-ball! * * * Dr. Moffatt should read his *Botanist* more carefully!

What one gets out of a garden depends somewhat on who he is. Some get only vegetables wherewith to promote their physical well-being, others return with flowers to minister to their sense of beauty and still others, though these are greatly in the minority, return with new ideas to delight themselves and others. To the latter class belongs Charlotte Rider Lomas the auther of "Garden Whimsies" recently issued by the Macmillan Company, who has written an entire book about gardens in general and her own garden in particular without a word about planting, cultivating, or the allied subject that all other authors of garden books feel compelled to put into their volumes. The book does not even contain a description of the flowers usually found in gardens though it deals with all of them. The title of the

book exactly describes it. Here the author has set down with much sprightly humor the ideas suggested by her associations with the flowers. Fact, fancy, suggestion, and opinion are delightfully blended to form a new sort of book that all who possess gardens will enjoy. There are no illustrations; such a book needs none. The price is $1.50.

In the "Story of the Maize Plant" Paul Weatherwax attempts to clear up some of the mystery surrounding the origin and distribution of that plant which the first settlers designated as Indian corn, which we commonly call corn and which is more properly known by its aboriginal Indian name of Maize. This largest of the cereals—really a big-seeded grass—is one of America's few important contributions to the staple crops of the world. It appears to have originated somewhere in Central America or Mexico but all trace of its ancestors have been lost. There is a large Mexican grass known as Teosinte which has often been suggested as the plant from which our maize originated but the author concludes that the only relationship between the two is that due to descent from a common ancestor. More than two hundred pages are devoted to other features of maize—the structure and physiology of the plant, the morphology and homologies of the two kinds of flowers, pollination, fertilization, seed formation and even cultivation and harvesting. The ecological and economic aspects of maize are also considered; in fact, it would be difficult to find anything of value about maize that the author has omitted. The book is intended for the general reader and is well and clearly written. There are two colored plates and 172 figures in the text. It is published by the University of Chicago Press and costs $1.85, postpaid.

A country that is using wood four times as fast as it is being produced is headed straight for trouble, but this is ex-

actly the condition prevailing in America at present according to Arthur Newton Pack, whose book "Our Vanishing Forests" describes the haste and waste with which we are destroying our woodlands and make a strong plea for their greater conservation. Each year we use enough railroad ties to lay a track five times around the earth at the equator, the wood pulp used in the newspapers of our country annually would make a strip of newspaper width half way to the sun, and this does not include the paper used in books. Each year the lumber produced would build a double row of five-room houses clear across the continent and back, and each year fire destroys enough forest to build a double row of the same houses from New York to Chicago. Even the props used in coal mines call for two hundred million cubic feet of wood annually. Things have come to such a pass that we are actually importing sawdust from Europe! Few people realize how varied the uses of wood are. The author says "We do not have to go to the lumber-yard to buy wood. We buy it in furniture stores, grocery stores, book stores and drug-stores." Telegraph poles and toothpicks, barrels and crates, buttons, and clothes-pins, crutches and golf-sticks, pencils and rulers, paper and matches, paving blocks and spools, piling and shoe-pegs, tanbark and excelsior, fence-posts and fuel all make a heavy drain on the forests not to mention turpentine and maple syrup, alcohol, drugs, dyes and many others. And the demand is four times larger than the supply! We once had eight hundred and fifty million acres in forest; now more than half of this area has been cleared. The rest is disappearing at the rate of ten million acres annually. Contrary to general opinion, the land thus cleared is not used for agriculture to any great extent. More than eighty million acres of cut-over lands contain only second-growth and cull

trees and another eighty million acres produce absolutely nothing. The author concluded that it is the part of wisdom to reforest these waste lands immediately. With reforestation, "a tree for a tree," protection from fire and a more economical use of forest products it is possible for our country to live within its timber income. The author's style is direct and convincing and the unique illustrations are calculated to arrest attention. It is a book everybody ought to read. It is published by Macmillan at $2.00.

To one who in the ripening days of August fares through uncared-for country roads, few bushes have more charm than the elder. In every fence corner, bordering the tumbling stone walls, and in unbrageous clumps by the brookside stand these spreading shrubs with dull green foliage and heavy clusters of small purple-black berries. Not seldom wild vines run riot through the gray clustered stems; and the clematis, the traveller's joy, tosses the white foam of its airy bloom over the full fruitage. The elderberry crop never fails. Huckleberries and blackberries, other children of the wastes, may have dried in the droughts of midsummer, but the little elderberries, full of crimson juice, crowd in close cymes on every branch. Pleasant refreshments for him who strolls afield, they may be used in many ways and when other fruits fail may be of no slight importance to the housekeeper. Elderberries make a close second to the best huckleberry pies if they be but skillfully blended with spices. Elderberry jelly is firm and flavorous with a racy tang of the woods; and elderberry wine said to reproduce the boquet of Frontignac, sparkles through all English story of rural life.—Martha B. Flint.

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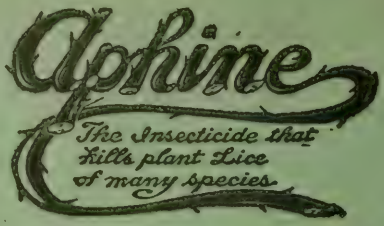

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WILD SWEET WILLIAM.—*Phlox divaricata*

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All day the blasted oak has stood
A muffled wizard of the wood;
Garland and airy cap adorn
The sumach and the wayside thorn,
And clustered spangles lodge and shine
In the dark tresses of the pine.

Trowbridge.

OUR NATIVE PHLOXES

By WILLARD N. CLUTE

THE phlox genus may be said to be exclusively North American although a single species of the West extends into Siberia. There are some thirty species of phloxes in the world and all are perennial except the well known *Phlox drummondi* of Texas and adjacent regions. Other species are found in practically all parts of the United States, but the species are most numerous in the West. As regards abundance of individuals, however it would be difficult to find a spot in which they were more plentiful than in the one shown in our frontispiece which was made from a photograph taken in Northern Illinois.

The species illustrated is *Phlox divaricata* often called *P. Canadensis* by nurserymen. This species occurs in most of the territory east of the Mississippi. All of the other Eastern species appear to avoid New England. One or two reach Connecticut but New York or Pennsylvania seem to be the north-

eastern limits for most of them. *Phlox maculata* and *P. paniculata*, the progenitors of our garden phloxes are rather southern in distribution while *P. amoena*, *P. ovata* and *P. stolonifera* are disposed to haunt the Alleghanies. *Phlox pilosa*, *P. argillacea* and *P. bifida* favor prairies and dry hills. *Phlox glaberrima* is reported to be a prairie species but it occurs only where the soil is quite moist. *Phlox pilosa*, on the other hand, is found only in dry places and *P. bifida* almost demands sand. The prairie species are fond of growing together in close-set and extensive colonies and when in bloom light up the landscape in a manner well justifying the generic name which means flame.

Phlox subulata is the moss pink, well known for its predilection for rocks and stony hillsides. One of the handsomest species of the Rocky Mountains is *P. Stansburyi* which delights in dry banks in the open sun or light shade. The large magenta flowers are among the largest in the genus. *Phlox Hoodii* is another widespread species that suggests the eastern *P. subulata*. There are a number of other Western forms that are well known but in general they have not impressed themselves upon the attention of the plant lover to a degree sufficient to make them the subject of much botanical discussion. All, however, are so strongly marked with the phlox characteristics as to rarely be mistaken for something else.

BOTANIZING IN SOUTH-EAST GEORGIA

By Mrs. Mary W. Diddell.

WHEN, not long ago, I had to take a trip beyond the Satilla river which bisects our county about half a mile from my home, I welcomed the opportunity to make a

brief study of the flora along the way. At the County toll-bridge the porch of the bridge-keeper's house was covered with the woodbine which gives our little town its name. At this season it was gay with its scarlet flowers. From the bridge I could see a point down stream where I went last April by boat for the beautiful *Hymenocallis occidentalis*. They always grow in marshes and can usually be reached only by boat at high tide. I secured some eighty bulbs which are now making themselves at home around my lily pool. This is the loveliest *Hymenocallis* I know of. It does not grow large with a thick stem, like its now widely-cultivated relative *Hymenocallis Caribbaeum*. It has two or three flowers to the scape. The divisions of the perianth are long and strap-shaped and the filaments are connected for more than half their length by a cup-shaped "crown." Except for the versatile golden anthers the flowers are white and very fragrant.

Afted crossing the bridge the road goes over a mile through a salt marsh. This was formerly a rice-field, but the present owners have allowed the marsh to grow up to saw-palmetto and *Pontederia* with an occasional open pool in which *Nymphaeas* were growing. Great numbers of birds visit the marsh on their annual migrations. As we rode along a three-foot alligator crossed in front of us and slithered into a pool below the road. Farther down the river are large areas of thick swampy woods full of deer, turkey, and wild-cats. It is a paradise for botanizing but not even the possibility of finding a *Gordonia pubescens* would take me there, for rattlesnakes and the equally deadly cotton-mouth moccasins also abound.

After leaving the marsh the road turned off through pine flat-woods, mostly second-growth pines sparsely scattered owing to the nefarious practice of "boxing" young trees. Every-

where under the pines were little *Pinguiculas,* mostly purple varieties, ranging from deep mauve to nearly white with occasionally the rarer yellow *P. lutea.* In all the streams and roadside ditches the pinguicula's aquatic relative, the yellow-flowered bladderwort (*Utricularia*) was to be seen. There was also a yellow-flowered legume which I took to be a *Crotalaria,* and everywhere the yellow-flowered St. Peter's-wort (*Ascyrum stans*). Its relative the pink *Elodea* I have seen occasionally in moist places, but it is not common like the *Ascyrum* and the *Hypericums.* Scattered in low places were large clumps of pitcher plants (*Sarracenia*) also called trumpet leaf and huntsman's cup. The flowers, with large umbrella shaped stigmas, are called watches. So far I have only found the two yellow-flowered varieties here.

The numerous small swamps or "bay-heads" through which the county road passes holds much of interest. They are usually composed of a dense growth of bay-trees, cypress, sweet gum, magnolias, sweet olive, and gall-berries with other less common varieties according to location. Growing along the edges where the ground is moist but not wet, are usually to be found large clumps of *Baccharis halimifolia* which in October and November are literally covered with the cottony white blossoms. This species has the distinction of being our onlyComposite to attain tree-like proportions.

In the wettest places in the bay-head are purple and yellow *Iris versicolor,* (I have looked everywhere for the loveliest, *Iris hexagona,* but haven't found it yet,) *Pontederia, Sagittaria,* and bladderwort and in the open water great masses of the dainty parrot's feather (*Myriophyllum.*) I do not know of anything lovelier than this latter plant. It is easy to transplant and I have quantities of two varieties growing around my lily-pool. Nor must I forget the lizard's tail

(*Saururus cernuus*) found wherever the ground is wet, with arrow-shaped leaves and terminal spikes of white flowers drooping over at the tips.

In the most interesting swamp we passed, I found a number of specimens of an *Aesculus* with palmately divided leaves composed of five leaflets slightly drooping on long red petioles. The bright-red terminal flowers were arranged in threes on red peduncles. The numerical scheme of the flower is unusual, there being a five-toothed calyx, four petals and seven excluded stamens. There were several stems thrown up from a creping red rootstock, and most of the plants were bushy in appearance and not more than four or five feet high, though back in an open place in the swamp I saw a tree fifteen or twenty feet high of loose open habit and every branch crowned with crimson flower-spikes.

Close by a little bridge were tall, slender yaupon holly trees and in a tangled mass over all climbed blossoming bamboo vines (Southern smilax) and *Ampelopsis arborea* just putting out its bronzy leaves which later turn a lovely iridescent green. I do not know of a common name for this latter vine. The flowers are inconspicuous and the natives confuse it with a trumpet-creeper (*Bignonia*) which is very *un*like it, as this has delicate compound leaves of a very different shade of green from the once pinnate leaves of the creeper.

In another swamp, we found numerous pink azaleas almost done flowering and the graceful fringe tree (*Chionanthus virginica*) which at a distance appeared to be a cloud of white. Almost at our journey's end was an open glade covered with large clumps of scrub palmetto and several small specimens of cabbage palmetto. The cabbage palmetto is very slow-growing so that while not over eight or ten feet high they were probably more than twenty years old. The old leaf-sheaths

remain on for several years before falling away and the young trees have a much greater circumference than the old ones. In South Florida the young leaf-bud is dug out of the top of the palmetto and cooked much the same as cabbage. It is ivory-white and very tender with a delicious nutty flavor. No picnic was complete without a pot of "cabbage" cooked on the spot in an iron pot brought for the purpose, especially when it was a Thanksgiving picnic and a brace of squirrels was added to the pot. If there is anything anywhere that tastes any better, I should like to find it.

THE ARBORESCENT FLORA OF MIDWEST FARMSTEADS

By T. J. Fitzpatrick

WHILE making a canvass of Buffalo county, Nebraska, during August 1922, for the purpose of eradicating the common barberry, the writer became interested in trees and shrubs usually planted in rural dooryards. Buffalo county is situated on the north bank of the Platte river, near south central Nebraska, in the semiarid region. The rainfall is about 25 inches per year as an average, with years of much less as was the year 1922 when the amount was about 19 inches.

The arborescent flora about or in the dooryards is a planted one; the purpose is to secure shade and ornamentation. The results obtained depend enterely upon selection, location, and care, as well as skill in planting. Many dooryards were seen that were absolutely without trees or shrubs of any kind. A little buffalo grass or other native grasses, a few ruderals or native plants of the nearby prairie made up the vegetation of the yard. In other words the dwelling had been erected

on the native sod and the vegetation present was a remnant of the original one along with a few rederals in competition with human occupation. Under such conditions during the sunny days of the long summer drought there was a maximum of dessiccation which produced an environment unfavorable to either plant or human occupations. As a consequence abandoned farmsteads were much too frequently in evidence for the good of the former occupants or of the present community.

The general favorites among the shrubs are lilac, spiraea, matrimony vine and rose, about in the order named, though the choice of the pioneers was evidently lilac and matrimony vine, the spiraea being a later introduction. Most other shrubs were of much later planting, some only in recent years. The early trees were cottonwood, box elder, white elm, soft maple and ash. Later plantings included juniper, black locust, black walnut, hackberry, catalpa, mulberry, osage orange, etc.

A few groves of considerable extent were observed on the prairie which had their origin in early plantings, doubtless prompted by a tree-planting statue. Some of these are in excellent condition, having a good location and a suitable selection of trees; others present an indifferent appearance, the location being poor and the trees unsuitable to the environment. In some places the tree plantings were rapidly becoming less in extent, the encroaching prairie taking up the abandoned area. The average conditions are suitable to tree growth but the extremes prohibit such vegetation.

Lilac is the shrub most frequently seen in the region under consideration. It was planted as a hedge along the border of the dooryard or a single shrubs or clumps almost anywhere in the yard. When planted as a hedge it may oc-

cur along any one or more of the four sides or occasionally it appears as a wing out from any corner of the house. All of the old plantings seem to be those with broadly ovate leaves and blue or purplish to white flowers (*Syringa vulgaris*). Some of the older and many of the later plantings have narrowly ovate leaves and white flowers (*Syringa persica*). In Buffalo county the lilac rarely grows higher than six to eight feet. Often it is pruned to give a desirable ornamental hedge effect. It is hardy and does well in this region but during the present drought it was noticeable that conditions had nearly reached the limit for its continuance. No evidence was found that any had succumbed during a previous drought.

The lilac was evidently much in favor with the early pioneers. This is apparent not only from the age of the bushes but also from their occurence about long-ago abandoned house sites. In many cases practically every trace of a pioneer dwelling had disappeared save for a single clump of lilac. Sometimes nothing was to be seen of the dwelling save a scarcely visible quadrangle, a remnant of the foundation, or more or less of a depression indicating the former cave or cellar; but the lilac remained as a solitary sentinel of the past and forgotten. In one instance I found a lone clump of lilac in the midst of a cornfield. It was the last trace left of an ancient dooryard.

Spiraea or bridal wreath is the next shrub in frequency and seeming favor. It is planted singly and as a hedge; the hedge being planted as a border and the shrubs in any convenient opening. The shrub is well adapted to this region, showing little if any discomfort from the drought. The bright green foliage is a welcome sight at any time and the

shrubs are very beautiful during the flowering period. The species usually found seems to be *Spiraea vanhouttei*.

Matrimony vine (*Lycium vulgare*) is a frequently observed shrub, sometimes planted as a hedge, but not often as a single shrub. It does very well but has the bad habit of spreading and in some places becomes a pest. When planted in a row with a low trellis through the middle it makes a rather striking ornamental hedge.

Roses are commonly planted as single shrubs, occasionally in rows or thickets. Two or three species are usually seen, among them the climbing rose, the eglantine, etc.

Cottonwood was often planted by the pioneers either for shade, when only a few were planted, or for windbreaks when many were planted closely in rows. The larger plantings are mainly in the Platte, Loup, and Wood river valleys; only small plantings occur on the uplands. Many of the early plantings are now large trees with forest conditions and the usual undergrowth. The plantings were around or adjacent to the farmsteads and if large extended along the fields adjacent to the highway. The most extensive planting and one of the older ones that I observed was on the south side of the Platte river, southeast of Kearney. Here several closely planted rows for miles flank the highway which runs eastward, the rows gradually thinning down to one before ending. The species usually seen was the western one known as *Populus sargentii*. The cottonwood has some undesirable qualities and does not seem to be much in favor with recent planters in spite of the fact that it grows rapidly and gives considerable shade.

Red cedar (*Juniperus virginiana*) is frequently planted perhaps a few for ornament, but more often in rows, and then less for ornament than as a windbreak. The red cedar does

well in this region, needing but little care to prevent the ill effects of drought. The tree is often badly infected with the fungus popularly known as cedar apples (*Gymnosporangium macropus*). As a result all the neighboring apple trees were found to be badly infected with the cedar rust. The cedar has so many good qualities that the owners feel constrained to retain their trees in spite of its bad qualities. The apple crop however is not seriously considered as the region has not been developed as a fruit country.

Box elder (*Acer negundo*) has appearently always been in much favor as it grows quickly and gives the maximum amount of shade in the least time. It occurs planted as single trees or in rows for windbreaks.

Mulberry (*Morus rubra*) is frequently seen as a door-yard planting, but more often as a hedge or windbreak. The later plantings of mulberry seem to be the French mulberry (*Morus alba*). This one is often planted thickly in a row and kept trimmed down to about four feet in height as an ornamental hedge.

Black locust (*Robinia pcudacacia*) was not often seen but it occurs as a windbreak or as a shade tree. It is very pretty when in blossom but is subject to insect attacks and then is unsightly.

Honey locust (*Gleditsia triacanthos*) is not often planted. This tree has many good qualities and does not seem to be subject to fungus or insect attacks. All the trees observed were fine ones; the dark green foliage presenting a pleasing sight and they were apparently not affected by the drought. This tree should be more frequently planted, using the thornless variety. One farm about eight miles north of Riverdale has extensive plantings of this species.

Common barberry (*Berberis vulgaris*) was not often seen about the dooryards. All that I found occurred as single clumps and in one hedge. Every specimen was badly infected with the black stem rust of wheat (*Puccinia graminis*). The harboring of the common barberry is now prohibited by law in most of the wheat growing states. All the specimens found were dug up.

Japanese barberry (*Berberis thunbergii*) was not often seen about the farmsteads though frequently observed in the towns. This species is now replacing the common barberry in many places.

Green ash (*Fraxinus viridis*) is a frequently occuring tree, being planted either for shade or for a windbreak. During this season it suffered much from the drought.

Plum (*Prunus americana*) is not infrequent about farmyards. When this species occurs there is usually a thicket of them about the side or end of the yard or in the field adjacent. When a few are planted or if seed are dropped in likely places the number of individuals increase rapidly and spread along the fences or over uncultivated places and thus form the thickets so often seen.

Bush honeysuckle (*Lonicera tartarica*) is not infrequently planted as a solitary ornamental bush.

Mock orange (*Philadelphus coronarius*) occurs occasionally. Its numerous white flowers makes it very ornamental. At other times for lack of care it is an indifferent bush.

Snowball (*Viburnum opulus*) is not uncommonly seen in many dooryards and usually only one or two clumps will be found at any one place.

Privet (*Ligustrum vulgare*) is infrequent and when found it occurs as a hedge. It grows fairly well and when

properly trimmed it gives a pleasing background to proper plantings about the yard.

White elm (*Ulmus americana*) is often chosen as a shade tree and when planted with reference to proper space it develops a fine shade tree with no undesirable qualities. More of them should be planted.

Black walnut (*Juglans nigra*) was observed a number of times. It does fairly well in low places in which there is a deeper soil and more moisture.

Osage orange (*Maclura aurantiaca*) has been frequently planted along the borders of yards or roadsides as a hedge. It is quite effective but has undesirable qualities and is infrequently used.

Soft maple (*Acer saccharinum*) is frequently planted for shade and windbreaks. In the moister situations it does well.

Russian olive (*Elacagnus angustifolia*) has been frequently planted during the last fifteen or twenty years. It is quite ornamental and seems to resist the drought readily.

Tree of heaven (*Ailanthus glandulosa*) is occasionally planted for shade.

Service berry (*Amelanchier canadensis*) is sometimes planted. Here this species is shrubby, grows in clumps, and and usually has the appearance of a hedge.

Hackberry (*Celtis occidentalis*) is not often planted. In the lower situations it does fairly well but grows feebly in the higher and drier places. The leaves are frequently covered with insect galls.

Virginia creeper (*Ampelopsis quinquefolia*) is occasionally planted but frequently occurs spontaneously.

Catalpa (*Catalpa speciosa*) is not infrequent in many parts of the county. The many large flowers make the tree

very ornamental and the numerous leaves gives a dense foliage with much shade.

Choke cherry (*Prunus virginiana*) is occasionally planted and it also occurs spontaneously in border thickets. Here it is usually a shrub and does very well.

Lombary poplar (*Populus dilatata*) is occasionally planted. It does not seem to thrive very well.

White poplar (*Populus alba*). This species was observed about a few farmsteads.

Austrian pine (*Pinus austriaca*) is occasionally planted. The individuals examined were small trees and seemed to be doing fairly well.

Clammy locust (*Robinia viscosa*). A few specimens were infrequently noticed.

Trumpet creeper (*Tecoma radicans*) is frequently seen at some angle of the house or other convenient location.

PLANT NAMES AND THEIR MEANINGS—XVII

CRUCIFERAE—II.

By Willard N. Clute

OUR two species of *Barbarea* have a just renown as anti-scorbutics as the name of "scurvy-grass" applied to *B. verna*, suggests. This is one of the innumerable cresses, in fact it comes pretty near being innumerable all by itself, for of distinguishing adjectives this cress has "American," "Bermuda," "bank," "land," "winter," "Bellisle" and "early." The names for the most part are self-explanatory. "Bellisle cress" is said to refer to the fact that the plant is common at the straits of Belle Isle. This plant's sister species, *Barbarea*

vulgaris is the "common winter cress," "yellow cress," "bitter cress," "rocket cress," "winter rocket," "wound rocket," "Herb Barbarea" and "poor man's cabbage." Even in northern winters this plant remains green which accounts for the name of "winter cress." "Yellow cress" alludes to the numerous bright yellow blossoms.

The rockets are nearly as abundant as the cresses. The "purple rocket" is *Iodanthus pinnatifidus* which is also known as "false rocket" but there seems no need of the distinguishing objective when so many others are false. The true rocket, or at least the first one, *Eruca sativa,* has become sparingly naturalized with us. It is commonly known as the "garden rocket." The "American sea rocket" is *Cakile edentula,* while the "wall rocket," "sand rocket," "cress-weed," and "flix-weed" is *Diplotaxis muralis.* "Flix-weed" seems to have been originally "flax-weed." *Erysimum asperum* is the "prairie rocket," "orange mustard," "yellow phlox" and "western wallflower." Although called "phlox" and resembling the plants of that genus superficially, the flowers are quite different having four separate petals while in the phloxes there are five united.

Erysimum officinale is the "scrambling rocket" but its more familiar name is "hedge mustard," with such synonyms as "hedge weed," bank-weed" and "California cress." The last named is another illustration of the origin of common names. The plant was originally from the Old World, but its being found in California is enough to cause it to be named for that state. *Erysimum cheiranthoides* is the "treacle mustard" or "worm-seed mustard." The second name refers to the use of the plant, or to the reputed virtues of the plant, as an anthelmintic. The first has a curious history. When "treacle" is mentioned a sort of molasses or sugary solution

is usually understood, but "treacle" originally meant sovereign remedy, especially a remedy against poison. It is practically certain that none of the Cruciferae have any such properties but the idea crops out in connection with several species, especially *Thlaspi arvensis*. All the species of *Erysimum* are called "false wallflowers." The true wallflowers are regarded as belonging to an allied genus *Cheiranthus*. The truly true wallflower is supposed to be *C. cheiri*. It was so called because it is fond of growing on walls. The specific name of the "treacle mustard," therefore, would indicate that it has the best right to be considered the really false wallflower.

The last of the rockets to be listed here is the dame's" rocket," "night rocket" or "sweet rocket" (*Hesperis matronalis*.) The plant is frequently known as "dame's violet," the name harking back to the time when "violet" might mean any conspicuous flower. "Damewort" is supposed to be a still earlier name. The common name is undoubtedly a translation of the scientific one, but there are those who make scientific names to fit the case as there are makers of common ones and someone has suggested that the name is really from *Viola Damascena* and refers to Damascus the plant's place of origin. To this idea the name of "damask violet" gives support. The name of "summer lilac" is quite meaningless. Had it been "spring phlox" it might have been applied with some reason for at a little distance the plants, when in flower, strongly resemble the tall phlox. In Hill's "British Herbal" our plant is called "eve-weed," not in honor of the mother of our race but because it gives off its odor only at nightfall. From the odor, or color it derives the names of"night violet," and "queen's" "night-scented," "winter" and "rogue's gilliflower." The word "gilliflower," it may be added, is said to

have been derived from *Caryophyllon* the Greek name for clove tree and to have come down to us through the French *girolfe* and Middle English *gellofre* or *gelofer*. The plant commonly called "gilliflower" and with more reason, is the "clove pink" (*Dianthus.*) Our species seems to have fallen heir to the name by reason of its fragrance. The name of "rogue's gilliflower" applied to it has no base meaning being derived from the French *rouge* which means simply red, a color, by the way, which few Cruciferae favor.

It would be difficult to say which is the true mustard genus. Perhaps *Brassica* may claim the honor with the "white mustard" (*B. alba*), the "black mustard" (*B. nigra*), the "wild mustard" (*B. arvensis*) and the "Indian mustard" (*B. juncea*). Of these, all but the last are known as "charlock," a word with numerous spellings of which chadlock, kerlock, cadlock, curlock and skedlock may be noted. *B. arvensis* is also named "corn mustard" for its habit of growing in grain fields and "yellow flower" for its color. Its name of "kraut-grass," corrupted to "crowd-grass" refers to its use as a pot-herb and "runch-weed" or "crunch-weed" may also indicate edible qualities. This plant is also the "field kale" or "corn kale" names derived from "cole" and ultimately from the Latin *caulum* a stalk. *Brassica campestris* is the "rutabaga," *B. napus* is the "rape," *B. rapa* the "turnip" and *B oleracea* the "cabbage," the latter from the French *cabouche*, a head. A second "black mustard" or "wild mustard" is *Raphanus raphanistrum*, but this is more commonly known as "wild radish." This plant is another "charlock," "'kraut-weed" and "wild rape." Among other mustards may be mentioned the "tansy mustard" (*Sisymbrium canescens*) so called from its tansy-like leaves, the "tumble mustard" (*Sisymbrium altissimum*) also known as "Jim Hill mustard" from its

appearance along the railroad promoted by the person named, the "ball mustard" (*Neslia paniculata*), the hare's-ear mustard" (*Coringia orientalis*) and the "treacle mustard," or "garlic mustard" (*Allaria officinalis.*) This latter is also known as "garlic-root," "poor man's mustard," and "hedge garlic." Among the ancient names are "Jack-by-the-hedge" and "sauce-alone." The word "garlic" here employed, like the technical name, refers to the onion-like odor. *Sisymbrium Sophia* is known as "Herb-Sophia," "flax-weed" and "flix-weed," the last two given this species and several others for a fancied resemblance to the flax (*Linum.*) *Sisymbrium Thalianum* though a mustard, reverts to cress nomenclature and is the "wall-cress," "mouse-ear cress" and "Thale cress." The last name is derived from Johann Thal an obscure botanist but why it is applied to this plant we do not know. The name of "turkey-pod" is equally unintelligible.

The true "Mithridate mustard" is assumed to be *Thlaspi arvensis*, though other plants have been given the name and the term "treacle-wort" applied to it seems to confirm the assumption. The word "mithridate" alludes to an old idea that Mithridates VI, king of Pontus, made himself immune to poisons by taking them in small doses and then increasing the amount until such substances had no effect on him. In medicine a mithridate is a substance that will counteract poisons but our plant has no virtues of this kind. Additional names are "dish mustard," "field penny-cress," "bastard cress," "French-weed" and "fanweed." "Penny-cress" appears to refer to the round seed-pods and "fanweed" may be derived from the same source. How the name of "French-weed" came to be applied is a mystery to me. No doubt it has an interesting history if we could fathom it. In these pages Prof. Nelson has recently noted that in our Northwest

the plant is known as "Jim Hill weed" because introduced along the railroad sponsored by Hill.

After so much mustard, rocket and cress, it is a relief to turn to names showing more originality of application. We may start with "sweet alyssum" which owes the last part of its name to the fact that until recently it was known as *Alyssum maritima.* Now the generic name is known to the scientists as *Lobularia,* but the common name continues to be alyssum. "Sweet Allison" is a corruption of the name just given while "snowdrift" alludes to the abundant, though small, white flowers. The plant's most ancient name is "madwort," given from a belief that it was a cure for the bite of a mad dog. *Alyssum alyssoides* is also known as "heal-bite" and "heal dog." Still another "madwort" is *Alyssum saxatile.* This latter is also called "rock alyssum," a name suggested by its specific name, or perhaps both derived from the plant's preference for rocks. A garden name for this species is "gold dust." It may be added in passing that none of the plants mentioned as madworts are of the slightest use against hydrophobia; indeed it is quite likely that none of them is the original madwort.

Another European crucifer with wholly imaginary medicinal virtues is the little "whitlow grass" (*Draba verna.*) It derives its common name, as well as that of "nailwort," from an ancient belief that it would cure the form of felon known as "whitlow" which usually involves the finger-nail. "Whitblow," in spite of the fact that the flowers are white, is undoubtedly a corruption of "whitlow," while "shad-blow" is due simply to an interchange of names through ignorance, of which the folk-lore of plants affords so many instances. The name "shad-blow" belongs to *Amelanchier* of the Rosaceae. *Draba stylaris* is also called "nailwort" as well as "hunger-

flower." The last name is inexplicable unless it refers to the poor soil in which the plant grows. Here we may also record that *Subularia aquatica* is called "awlwort," on account of its slender leaves, and *Lesquerella spathulata* is known as "bladder-pod" from its round inflated capsules.

A little plant not unlike draba, is the shepherd's purse" (*Caspella bursa-pastaris*) whose common name is a direct translation of the technical one. The heart-shaped seed-vessels suggest the idea of a purse or bag which appears in several of its other common names such as "shepherd's bag," "shepherd's pouch," "lady's-purse," "witches' pouches," "case-weed," and "mother's heart." Related terms are "pick-purse" and "pickpocket." "Shovel-weed" also alludes to the shape of the pods while "pepper-plant" "pepper-weed" and "hen pepper" are due to confusion of this plant with species of *Lepidium*. The names of "toothwort," "toy-wort," and "St. James' wort" seem to be without significance in the present instance.

Though the shepherd's purse may, on occasion, bear the name of "toothwort," the name seems properly to belong to the species of *Dentaria*. *The* name is derived from the projections on the rootstock of some species. *Dentaria diphylla* is probably best entitled to the name, but "crinkle root," in allusion to the crinkly rootstock, is the one commonly used. Among the inattentive this becomes "trinkle root." "Pepper root" alludes to its pungent properties. It is well known to children who dig up the crisp, white underground parts and eat them. *Dentaria lacinata* besides being known as "toothwort" and "pepper-root," is also called "crowfoot" and "crowtoes." It is probable that the last two names refer to the small white tubers clustered at the base of the main stem.

An interesting crucifer occasionally found in old gardens

is the "honesty" (*Lunaria annua.*) It is said to derive its name from the fact that the seeds may be seen through the thin walls of the capsule. It is also known as "money-plant" and "penny-flower" in allusion to the large flat circular seed-pods. In the garden it is called "satin pod" and "satin flower" and the smooth and shining partititions of the capsule gathered for winter bouquets, after the rest of the pod has fallen. The name of "matrimony plant" applied to this species is a puzzle unless it too alludes to the round seed-pods—matrimony ever being greatly dependent on money. It is likely, however, that "matrimony plant" is a corruption of "money-plant." *Lunaria rediviva* is called "satin flower" "satin pod" and "perennial satin flower." It is in reference to these two species that the botanist, Asa Gray, is said to have perpetrated a bit of sly humor in his "Field, Forest and Garden Botany." After the first he writes "common honesty, not native to the country but cultivated in old fashioned places" and after the second, "perennial honesty, a much rarer sort, seldom met with here."

HOLLY AND MISTLETOE

HOLLY and mistletoe are regarded as symbolic of the Christmas spirit. The holiday season does not seem to have been properly observed unless there is at least one spray of holly flaunting its red berries from some prominent position in the house, or a sprig of mistletoe so placed as to catch unsuspecting folk.

Horticulturists will tell you that holly belongs to the genus *Ilex;* that there are over four hundred species, some of which

grow into dense bushes and others into trees of more than moderate dimensions; that the species is found plentifully in Europe and that it grows abundantly along the Atlantic coast of the United States. The bright red berries and glossy green leaves, which vary greatly even on the same tree, are familiar to all, but the blossoms, white or creamy in color, appearing in May, are not so well known. All through the winter the berries, which ripen in September, hang on the branches. The timber of the holly tree is very white and tough and hard and is used to some extent commercially.

Mistletoe is a parasitic evergreen living on deciduous trees as far north as New Jersey and Indiana and as far south as Florida and Texas. *Phoradendron,* is the Greek name for the American species of mistletoe and this "tree thief" may be found living on apple tree, thorn tree, maple, poplar, locust and linden, but rarely on the oak. The mistletoe of the Old World is *Viscum album,* and so plentiful is it in some parts of England as to give an orchard a blooming appearance even in the snows of winter. Our American variety is called a false mistletoe, but it has inherited all the store of traditions and legends gathered around the European mistletoe.

The association of holly and mistletoe with Christmas may be traced far back to the days when there was no Christmas and the pagan "festival of the sun", or Yuletide, was celebrated. Yuletide, the turning of the sun in its winter solstice, was celebrated as far back as 2000 B. C. by the fire-worshippers of Persia and India. They are known to have venerated the holly and to have used it in their rites. They believed that the holly tree cast no shadow and that it was highly efficacious to sprinkle the face of a newly born child with water impregnated with holly bark. According to tradition this was the bush in which Jehovah appeared to Moses.

It was in the days of the Druids, however, that we find the holly and mistletoe treated with peculiar veneration and credited with supernatural powers. They attached special significance to mistletoe, particularly, when it was discovered growing on an oak tree. When such a growth was found it was gathered by the priests who, ceremoniously clad in robes of white, employed all the rites essential to so solemn an occasion. For the ceremony a golden sickle was used—a sickle which was never used for any other purpose. This highly-prized mistletoe was sent to various important families with appropriate Yuletide greetings. The recipients of this token of appreciation were expected to reciprocate with timely and generous contributions.

It is interesting to find that holly was used in the Saturnalia of the Romans which was celebrated in December when the sun began its upward course, and corresponded to Yuletide. When the Christians began to celebrate the birthday of Christ it is said that they too used holly in order that they might not appear conspicuous among the Saturnalians. With the spread of Christianity and the indentification of the day of the birth of Christ as the twenty-fifth day of December, a date coincidental with Yuletide, the celebration of the birthday of the sun was gradually resolved into the Christmas festivities. In the process much of the ceremony and tradition attendant upon the pagan festival was quietly transfered to the Christian observation of the day.

Holly has been the subject of much superstition and legend. Pliny says that holly planted about a home serves as a charm and keeps away all ill spells, and also guards against any misdirected bolts of lightning. It was popularly believed in the middle ages that witches used holly in the manufacture of their midnight spells and incantations. Berries from holly

and juniper and mistletoe were employed to form a witch's chain, each link being finished with an acorn. In those times, and even to this day in some parts of rural England, it was considered unlucky to bring holly into the house before Christmas eve. It was also considered very unlucky not to have the holly taken down before Candlemas eve. The maids about the house who were so careless as to forget this task were certain to be terrified by mischievous sprites and unsightly hobgoblins.

Mistletoe was long supposed to have magic power. Certainly the withered spinster who found herself bussed beneath its white berries must have believed devoutly in its magic—a magic rite which has been passed down through the centuries. According to the old Norse legend, it was a spear tipped with mistletoe that was used to kill Balder, the sun god. It had been sworn that nothing "that springs from fire, air, earth or water" should hurt this celestial favorite. So the wicked and ingenious Loki, hating this Appollo of the North, made an arrow of mistletoe which he gave to blind Hoder to test. the god of darkness shot the arow and killed Balder. At the urgent pleading of all the gods and goddesses Balder was soon restored to life, and mistletoe was thereafter given into the keeping of the goddess of Love to prove that its berries were the emblem of love and not death.

From such a background of beneficence it was not unnatural later to find mistletoe considered a sovereign remedy for all diseases. It was employed for epilepsy and convulsions. Holly was also believed to have great medicinal powers, although there may be found no authentic record of any remarkable cures it effected. It is not employed in modern times, unless the good cheer it brings be considered medicine.—*Mary M. French, in Farm and Garden.*

NOTE *and* COMMENT

BIDENS TRICHOSPERMA.—The tickseed sunflower (*Bidens trichosperma*) belongs to that despised race known collectively as beggar-lice, beggar-ticks, pitchforks, cuckles and stick-tights, but by reason of its floriferousness, it rather lifts itself out of its class. In parts of Illinois, notably near the head of Lake Michigan, it fairly takes the landscape in late August and becomes the most abundant and most conspicuous of flowers. It grows in dense masses over wide areas and at the height of its season, no desert golden with rabbit-brush, no meadow taken by buttercups or rudbeckias, and no field of goldenrods can compare with it. It is the apotheosis of yellow! The range of this species is given as swamps near the coast from Massachusetts to Virginia with a second area from New York to Illinois and Kentucky in which it is found. No reason has been given for this curious distribution and some small difference in the fruits indicate that the western plant may possibly be regarded as a variety.

THE MANZANITA.—The beautiful shrub found in the mountains of California and Arizona and known as the manzanita is worthy of more extensive cultivation. The name means "little apple" as the small fruits that follow the bloom resemble the apple in color and taste. The shrubs may be recognized by their brownish-red trunks and branches. The flowers are a delicate waxy pink with red stems and are very fragrant. The wood, though small and twisted makes a wonderful stove-wood. It throws out an intense heat and leaves no soot.—*Mrs. O. A. Budd.*

Nectaries of Toad Lily.—The toad lily (*Tricyrtis hirta*) which seldom blooms in the Northern States until after the first frosts have appeared, is a most interesting flower. Its three styles are surmounted by bifid stigmas which radiate from the center like the spokes of a wheel and leave six openings which are filled by the anthers of the six stamens. Nectar is secreted by the three outer members of the perianth—really the sepals—each of which has a rounded hollow at base in which are two nectar pits. Both petals and sepals are white but so thickly dotted with purple as to have a purplish effect. At the entrance to each nectary, however, the purple stops abruptly and is replaced by a pair of small orange-colored nectar guides. The petals lack nectaries but the appearance of the nectar guides upon them indicate, perhaps, that they secrete a small amount of nectar, also. Various kinds of bees frequent the blossoms but in northern latitudes the frost is almost certain to kill the aerial parts of the plant before the seeds ripen. The toad lily is not found in every dealer's catalog, but it is an attractive little plant and well worth adding to the garden. It is the very latest of the monocots to bloom if we except the autumn crocuses which really ought to wait till spring. An illustrated account of our species appears in this magazine for October, 1920.

Symbiosis in the Rubiaceae.—The legumes have long enjoyed the distinction of bearing nodules on their roots in which live multitudes of bacteria capable of fixing atmospheric nitrogen in a form available for higher plants. This enables the legumes to live in soils in which other plants, lacking the friendly bacteria, would find existence difficult. Anybody who will dig up the nearest plant of clover or alfalfa may see these nodules for himself. It has been known for some time that certain members of the Rubiaceae also

possess bacterial nodules, but the knowledge has not been very widely disseminated. L. A. Boodle in *Kew Bulletin* points out that several Indian plants belonging to this family have wart-like structures on the upper surface of their leaves in which such nitrogen-fixing bacteria occur. The bacteria have been named *Bacterium rubiaccarum* and have been found plentifully in *Pavetta Indica* and *P. angustifolia*. The bacteria cross from one generation to the next by way of the seeds in which they lie dormant until a new plant begins to grow when they gain access to its interior through the stomata. *Ardisia crispa,* one of the Myrsinaceae, is another plant reported to have nodules of this kind.

Owners of Complete Sets.—Set 74 of this magazine is now the property of Lawrence College, Appleton, Wis. The University of Nebraska has also completed its set by securing missing back numbers and now should stand 75th in the list of owners. This set is of interest because it was originally the subscription of the late Dr. Bessey. Mr. F. L. Green, Greenwood. Ontario, Canada, lacks No. 124 (February, 1920) to complete his set. If any reader can supply this number, we will be glad to forward it to Mr. Green. The small stock of magazines on hand makes it necessary to again advance prices. After January 1st, 1924, a set of the first 25 volumes will cost $20.

Cockle-bur Poisonous.—Each year new instances of the poisonous nature of plants usually regarded as harmless, come to light. Things have come to such a pass that even the pig has to have a chaperone to keep him out of trouble. Investigations by the United States Department of Agriculture show that young cockle-bur plants may prove poisonous to hogs, sheep and cattle. They are especially harmful to young pigs. About a pound and a half of cockle-bur to a

hundred pounds of animal is sufficient to cause poisoning. Few animals succumb to the poison, however, being easily cured by being fed milk, bacon-grease, lard or linseed oil.

Government Plant Importations.—In the early days of this country, when seedsmen were less numerous than at present and communication more difficult, the national government undertook to distribute seeds of useful plants in the interests of a better agriculture. The progress of time has made such distribution of little value, but it has been long persisted in, possibly because our legislators assumed that the receipt of a few packages of garden seeds each spring, would serve as a gentle reminder to the voter that his Congressman was on the job. In recent years another distribution of seeds and plants has been instituted by the Government which appears to be of the highest usefulness. The plants that figure in this distribution come from the ends of the earth, sent in by botanical explorers, botanical gardens, experiment stations and private individuals interested in advancing horticulture. The number of different species thus distributed is now more than fifty thousand! As may be inferred such specimens are sent out to those only who have adequate means of testing them and a disposition to make careful records of their behavior under cultivation. The only criticism of the distribution that can be made is that the majority of the plants are such as thrive only in the warmer parts of the world. What is needed is a special hunt for plants that will thrive in regions less favored by nature such as cold or arid regions.

Origins Indicated by Plant Names.—It is well known that most of our tree fruits come to us from southern Europe and the region surrounding the Mediterranean, and accordingly we find their names derived from the Greek and Latin languages. Such are the peach, the pear, the apricot,

the nectarine, the damson, the plum, and the prune. These are anglicised forms of the old Greek and Latin names that have reached us after passing through some Romance tongue —French, Italian or Spanish. There is, I think, but one exception to this rule. The word, apple, is of the Teutonic stock and accordingly we find that the apple is the only tree fruit of any importance that is indigenous to the northern part of Europe. The same is true of forest trees. The oak, holm oak, ash, beech, hornbeam, yew, hawthorn, holly, aspen, maple, lime, alder and elder all have Teutonic names, indicating that they grew in northern countries in ancient times. The names of the cypress, elm, chestnut, poplar, fig, myrtle, box, sycamore, pine and larch are words of southern origin, showing that these trees came from the south. This principle runs through the whole list of plant names and therefore to know the region from which the name of any plant came, affords a fair presumption of the region where it is indigenous.—*T. S. Lindsay in "Plant Names."*

Amphichromy in Four-o'clock.—There are many species of plants which, under the hand of the plant breeder, produce flowers of different colors but cases of amphichromy, in which a single plant produces flowers of more than one color, are extremely rare. An interesting case of this latter kind has appeared in the writer's garden in which a specimen of four o'clock (*Mirabilis jalapa*) which originally produced pale pink flowers has developed more versatility and now produces red flowers, also, on some branches. As to the pink flowers, it may be said that a close inspection shows the pink to be due to a great number of tiny half-obscured red dots. One might almost conclude that the pink form is on the way to becoming a red one. The four o'clock produces a great variety of color-forms ranging from white and yellow to deep

red and has been greatly mixed by crossing. In experiments with this plant it has been found that when two pale forms are crossed, a red-flowered form is produced. This is explained by the theory that one plant has the material for making red flowers and the other has the determiner that causes the color to develop. In the plant under discussion it may be that the pale form is developing its own determiner. Its subsequent career will be watched with interest. The specimen mentioned is nine years old, at present, and has had an interesting history. One year it was overlooked entirely and did not get back into the ground for eighteen months. During this time it had neither water nor soil. This might warrant one in suggesting that though it has been alive nine years it might with some reason lay claim to being only eight years old. The past summer it produced more than ten thousand flowers!

The Largest.—It is human nature to delight in mere size. At the country fair the prizes usually go to the largest and we commonly speak of the size of our home town before dilating on its intelligent citizenry. The largest plants and plant parts, therefore naturally are of interest. The largest flower in the world is the *Rafflesia,* some specimens of which measure more than a yard across. The largest flower-stalk is said to be that of *Furcroya gigantea* from which Mauritius hemp is obtained. It often reaches forty feet or more in height Credit for the largest inflorescense probably belongs to this plant also, unless some species of Agave can muster more flowers to a stalk. The largest leaf is that of *Victoria regia,* the giant water lily of the Amazon, which often measures twelve feet across. The largest seed is the double cocount which weighs thirty pounds or more, but the largest fruit is undoubtedly the prize pumpkin, cynosure of everybody at the country fair. The largest herb is the banana and the

largest tree the redwood. The latter also has the thickest bark—18 inches or more in some cases. Which vine is the largest will have to be left to somebody more familiar with tropical botany than the writer. If anybody knows of larger specimens than here mentioned, we would be glad to hear from him.

Lonicera Tatarica Speciosa.—One of the commonest species of honeysuckle in out-of-the-way places is *Lonicera tatarica*. It seems to have been a favorite with the old settlers and vies with the common lilac for a place in the old-fashioned garden. In spring when covered with its rather small, pale pink flowers, it is fairly attractive and is still often planted in parks and large estates. The ordinary form, however, is so greatly inferior to other forms of the same species that one wonders how the original ever gets planted nowadays. The most attractive form has deep pink flowers nearly an inch across and borne in great profusion. When in flower it does not suffer in comparison with the red-bud, wild crab or any other shrub of its genus. In the dealers' catalogues, the pink form is called the variety *grandiflora, grandiflora rubra, splendens* and *pulcherrima*. It is quite likely that each name may stand for a slight difference in form, for the species is quite variable. One should see the shrub in bloom to make sure of getting the best.

Aster Laevis.—Late in September in the Northern States, the asters begin to command attention by reason of their abundance, variety, and striking range of colors. One who examines a field of these plants soon discovers that several species commonly grow together though their color variations often give the impression that there are more species present than is the case. The New England aster is nearly always accompanied by a clear rose-colored form much hand-

somer than the type and an albino form is not difficult to find. The most beautiful of all the aster species in the Middle West, however, is *Aster laevis* whose large, deep violet-colored flower heads, borne in profusion are fully the equal of any plant cultivated in the flower garden at the same season. Why this plant is not oftener given a place beside the chrysanthemums is a puzzle. The plants seem fond of the waste land along the railroads and would make traveling by rail a continual delight for some weeks in autumn were it not for the fact that thoughtful railroad officials, impressed with the beauty of bare cinders, send out a few laborers with scythes, just as the blooming season opens, to lay the plants low. Here and there, however, enough plants escape to provide the flower lover with the materials for a planting that will eclipse both the late garden asters and the early chrysanthemums.

Fringed Gentians.—Most people speak of the fringed gentian as if there was but one species of the kind in the world. No doubt this is due to the influence of Bryant's poem on the subject, but it may be well to note that there is another species, *Gentiana procera,* found from New York to Iowa and northward into Canada. *Gentiana crinita,* however, is best entitled to the adjective "fringed" for the tips of its petals are cut into fine segments of some length, while those of *G. procera* are merely ciliate on the edges. In other respects the two species are much alike and the inexperienced might easily collect *procera* with the idea that he had found its more famous relative. Westward the two species have practically the same range but on the east, *crinita* pushes up into Maine and south to Georgia.

Quack Grass.—The farmer or gardener who does not know quack-grass (*Agropyrum repens*) is to be congratulated. It easily excels the Canada thistle in general pestiferousness

and is regarded by the Government as "the most notorious of all weeds and one that causes greater monetary loss than any other single species." It comes originally from Europe but is now quite at home in America having spread widely in the Northern States but with, as yet, no disposition to invade the South. It is an active agent in the spread of the red rust of wheat but its eradication has none of the spectacular features connected with it that are attached to the pursuit of the common barberry and it therefore appears to be immune from the attacks of the young college graduate. Legislators may legislate against the thistle but they know better than to go after the quack-grass. The latter simply defies the farmer, the barberry eradicator and everybody else. It will grow in any kind of soil, and spreads rapidly by slender under-ground runners. When once established it is next to impossible to eradicate. Plowing only serves to scatter the runners and spread the plant more widely. Hand weeding might in time be successful but if one relaxes his efforts for a single season, back comes the quack grass as bad as ever. Buckwheat and hemp, however, have the reputation of being able to smother it. It makes a fair grade of hay and like its close relative, wheat, its seeds may be used as human food. Flour has also been made from the underground runners, and these are said to have been so used in Bavaria during the great war. Notwithstanding the abundance of quack grass in America we annually import some 250,000 pounds of it, the supply coming mostly from Germany. From ten to twenty cents a pound is paid for it. The imported grass is used in medicine under the name of dog-grass or as the physician is fond of writing it *"radix graminis."*

Purslane with Double Flowers.—The common purslane or pursley (*Portulaca oleracea*) is a well-known fat little

weed that is often a pest in rich garden soil. It is a close relative of the common rose-moss or portulaca (*P. grandiflora*) commonly cultivated in cottage dooryards but nobody would look to it for evidences of beauty.—Nevertheless L. H. Bailey reports a variety of this species (*P. oleracea* var. *giganthes*) which he found in cultivation in British Guiana, with flowers more than an inch across and completely double. It may be that others may find this latter plant worth a place in the flower garden, but the associations of this plant in the writer's mind is such that it is doubtful if he could resist pulling it up before it bloomed.

EDITORIAL

Beginning in 1924, it is our intention to issue this magazine on or near the beginning of January, April, July and October, instead of nearly two months later than those dates, as at present. This brings us more into line with the practice of other quarterlies and relieves us of explaining to new subscribers, each year, that the January number is issued in late February. Those whose subscriptions expire with this issue will naturally need to renew earlier to avoid the possible loss of one or more numbers. At present we are issuing only sufficient copies to take care of subscribers and continue the sets of back numbers still on hand. Often the supply of one issue runs out before the next is printed. In this connection attention may be called again to the fact that continuous subscriptions cost less than the annual subscriptions and may be paid for during the year when most convenient. Annual subscriptions are stopped at the end of the time paid for.

* * *

For a generation or more, the hunt for new species of plants has been pursued with astonishing intensity. It is to be feared, however, that in the excitement of describing species new to science, the species-maker has often yielded to the temptation to describe as novelties plants of very dubious standing. At one time the doctrine that any plant that differed from others in a single constant character was a good species gained wide acceptance. Botanists employed their talents in discovering differences rather than in studying such

differences to learn, if possible, whether they were of any special significance. On this basis, numerous old and familiar species were reported to be complexes from which a number of new forms could be derived. The result of such activities on the science of botany was to obscure what before was reasonably clear and to add to the perplexities of the beginning student who was too often lost in a maze of species which seemed all pretty much alike. For some time thoughtful students have felt that a re-examination of the evidence upon which such species were founded would be desirable, but the first tangible results of investigations in this direction have only recently appeared. Now the published results of such an inquiry into the species of *Atriplex*, *Chrysothamnus* and *Artemisia* by Frederic E. Clements and Dr. Harvey E. Hall seem to prove the desirability of similar studies in other genera. These investigators set out to examine, one by one, the characters relied upon to distinguish species in the genera mentioned with a view to deciding what are and what are not of diagnostic importance and thus establish a scientific basis for classification. Unlike other students they did not rely solely upon herbarium material but studied the plants in the field from Mexico to Canada and also made numerous experiments with the plants under cultivation. Collectors of herbarium specimens are noted for selecting the more striking plants and in consequence such specimens are quite misleading and not representative of the form as a whole. In the study referred to it was found that many plants described as good species were mere freaks or founded on characters that vary greatly in all the species. The old way of making a species was to label it new if it looked different; the new way endeavors to examine the differences to see if they are stable and of specific importance. In a survey as comprehensive as this it

was easy to decide what forms had departed enough from the original to be regarded as separate species. The investigators looked for "natural units" around which to group the insignificant forms which other authors had elevated to specific rank. An effort was made to get at the evolutionary history and establish the degree of relationship between different forms according to the lines of descent. Viewed in this light wholesale reductions were in order. In one case eighty-three species and forms were reduced to variations of a single variable species. The slender evidence upon which many species had been made was brought out by tabulation of their variations. The object of these reductions was to make taxonomy and classification better serve the student; to make the naming of plants less difficult. It makes a great deal of difference whether the type of a given group is regarded as a species and all its allied forms sub-species and varieties, or whether all are called species of equal rank. Moreover, to have a proper regard for varieties is in line with our ideas of evolution. Further studies of this nature, which the authors promise us, will, we hope, make such work fashionable and in time give us Manuals in which classification will mean something more than a mere list of apparently unrelated species. The results of the present study have been published by the Carnagie Institution of Washington.

BOOKS AND WRITERS

The fifth part of "American Plant Names" is about ready. This will complete the list of species and leaves only the index and finding list to be printed. * * * About ten thousand common names are included. * * * "Rhus Dermatitis" is the title of a new book by James B. McNair. * * *

The publisher translates this as "poison ivy" but it should really be "ivy poisoning;" at least that is what the author discusses. * * * There are said to be twenty-nine cures for ivy-poisoning but the book costs $4 and is likely to leave the buyer wondering whether it would not have been cheaper to have consulted a reliable M. D. in the first place. * * * Macmillans are about to bring out a "Manual of Cultivated Plants" by L. H. Bailey. * * * If there ever was a filler for a long felt want, this is it. * * * More is probably known about the relationships of the wild plants than about those we cultivate. * * * An "Illustrated Flora of the Pacific States" in three volumes is announced. * * * Specimen pages indicate that it is almost exactly like its namesake on the opposite side of the continent, except that the price is higher. * * * Norman Taylor is reported to have published a book with the title of "Botany; the Science of Plant Life." * * * We have not seen the book or any mention of it in the public prints. * * * Perhaps the publishers are trying to keep it a secret. * * * *Le Naturaliste Canadien*, the only magazine of natural history in America published in French, is celebrating its fiftieth anniversary. * * * *Le livraison pour Juillet-Aout est une publication tres interessante.* * * * Botanists having named all the species there are, and then some, are beginning a retreat. * * * In the September *Rhodora*, M. L. Fernald decides that *Lycopodium sitchense* is only a variety of *L. sabinaefolium* instead of a good species as formerly regarded. * * * We suggest *Lycopodium porophylum* as the next candidate to be reduced if the forms of *Selaginella apus* can wait.

Gebruder Borntrager of Berlin have begun the publication of an extended work on plant structurss under the title of "Handbuch der Pflanzenanatomie." The first sections deal

with plant structures in general and are followed by an account of the various plant groups. Nearly thirty German scientists are co-operating in the work under the editorship of Dr. K. Linsbauer. Several parts of the work have already been issued the latest being lieferung 9 "Das Tropische Parenchym" by Dr. Fritz Jurgen Meyer. The issues are very well printed and clearly illustrated but the fact that the text is in German will necessarily limit its circulation on this side of the world. Lieferung 9 costs $1.10.

It is difficult for the maker of a beginning course in botany to introduce much novelty into the text. The time-honored sequence begins with the seed or root and discusses the other plant parts in their order and few authors have found it possible to depart from such an arrangement. In a new book by Edmund W. Sinnott on "Botany; Principles and Problems" the usual sequence is followed but the author has succeeded in giving his book a valuable individuality by a clear and straightforward presentation of the subject matter, by numerous original illustrations and last, but by no means least, by a series of some 800 "Questions for thought and discussion." The latter initiate a new departure in botanical study and cover a wide range of ideas which show not a little ingenuity and originality on the part of the author. Added to these is a rather extensive series of "reference problems" designed to facilitate further investigations of each phase of botany discussed. In the text, the author has not found it necessary to argue in favor of each point presented but has taken well-established facts for granted, a praiseworthy feature in books designed for beginners. In addition to the discussion of plant structure, there are chapters on heredity evolution and the great plant groups. A large number of the 240 illustrations are from original drawings by the author

and are an agreeable relief from the stereotyped forms to which we have long been accustomed. In all its features the book makes a most agreeable impression, and it will no doubt have a warm reception from teaching botanists. The book runs to about 400 well-printed pages and costs $3. It is published by the McGraw-Hill Book Co., New York.

A generation ago the collection and identification of plants, the publication of floras and the making of manuals was perhaps the principal occupation of botanists, but the science has since moved on to other things—morphology, physiology, genetics and the like. Now there is rising a new phase of study known as ecology, which involves all the others, since it is the study of plants (and animals) in relation to their surroundings. Much of the matter published in this magazine would come under the head of ecology and much more is likely to be published since the field is right at the door of every student and is practically inexhaustible. The subject appears to have first received adequate recognition in Germany, but there is now a considerable literature in English. American students, however, have failed to produce books calculated to interest beginners in the subject; they have been so busy telling one another of their finds and conclusions that they have neglected the novice. In time we may hope for a better state of affairs here, but until then an attractive British book by A. G. Tansley, author of "Types of British Vegetation" and editor of the *Journal of Ecology* will doubtless be appreciated. It is entitled "Practical Plant Ecology" and is written expressly with a view to making the subject clear to beginners. In the opinion of the revewer the author has succeeded in making a very helpful volume. The idea that different forms of plants are associated in very definite groups called plant societies and plant associations is developed,that these groups are

definitely related to the soil and climate of their habitat is shown, the fact that such societies may succeed one another in a given area is demonstrated, and the methods of studying the phenomena connected with the subject is carefully indicated. Incidentally one gleans from the book a clear impression of the differences between British and American vegetation which inhabit similar areas. The study of ecology is certain to become more popular as it becomes more familiar and those who are inclined to investigate the subject would do well to see this book. It is published by Dodd, Mead and Co., New York.

We all of us love trifles at heart; the shapes and aspects of things, the quality of sounds, the savors of food, the sweet and pungent odors of earth. We persuade ourselves, as life goes on, that these things are unimportant, and we dull our observation of them by disuse; but in all the essayists that I can think of, this elemental perception of things as they are is very strong and acute; and half their charm is that they recall to us things that we have forgotten; things which fell sharply and clearly on the perception of our younger senses, or bring back to us in a flash that delicate wonder, that undimmed delight, when the dawn lay brightening about us and when our limbs were restless and alert.—A. C. Benson.

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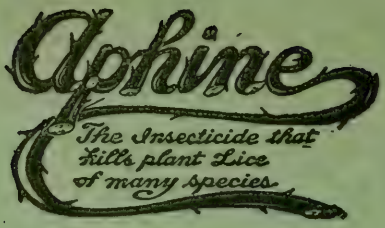

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THE PASQUE FLOWER.—*Anemone Patens* var.

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But these young scholars who invade our hills,
Bold as the engineer who felled the wood,
And travelling often in the cut he makes,
Love not the flowers they pluck, and know them not
And all their botany is Latin names.
Emerson.

THE PASQUE FLOWER

By FANNIE MAHOOD HEATH.

THE Pasque flower (*Anemone patens,* variety *Nuttalliana*) is the first flower to greet us in early spring. It is indeed a most pleasing sight to come upon a sunny, sandy slope or dry knoll of light soil where these flowers grow, as they are usually found in large colonies, each well established plant with from six to fifteen flowers, the ground literally carpeted with the bright blossoms. Each stout, furry stem is from four to eight inches high, and crowned with blossoms from one and a half to two inches wide. The sepals form tulip-like cups of varying shades from almost pure white, thru all the shades of smoke blue, to a soft delicate purple, each with many golden anthers and numerous pistils. The flowers are followed by fruit of long plumose tailed achenes in a globular, fluffy head.

Pasque flowers are found over a wide range of territory thruout the North-western United States and Western

Canada. They do not take kindly to cultivation and are exceedingly hard to domesticate, yet when once established where conditions suit them they increase rapidly both from the seedling plants and the enlarging of the flower clumps. They are known by various common names, Pasque flower, wind flower, Mayflower and wild crocus being the most universally used. I have also heard them called rock roses, from their growing on stony knolls, and prairie hen flowers because the prairie chickens sometimes eat them in early spring.

THE CHARM OF CALIFORNIA WILDFLOWERS

By Nell Crosby.

DRIVING or walking through the country in springtime, who is not delighted with the beautiful wildflowers that are to be found in the woodlands or dotting the grassy meadows? Most states can boast of many lovely varieties peculiar to their locality, but to California must be given the credit for producing such gorgeous profusion as to almost beggar description. On the burning desert, over the fertile valleys, dotted among the stunted growth in the foot-hills and reaching far up into the mountains, in the spring and early summer such splendor of color and bloom greets the eye that it is no wonder California is called "the land of flowers and sunshine."

With so many varieties and such abundance of bloom literally carpeting the earth in many places, one cannot do the subject justice without going into lengthy detail, but I shall mention briefly, some of the most luxuriant specimens. In the early spring the brodiaea or wild hyacinth, takes the lead with its clusters of purplish blue blossoms, a very magnificent

flower, lasting for weeks. Fading finally to a pale blue, it disappears to be replaced by the wonderful California poppies which by this time turn the rolling hillside and wide plains into a flaming, living gold, in some sections covering miles with a wave of solid, unbroken color.

Now blending with this brilliant "carpet of fire" the blue lupin in direct contrast, blooms in wide spreading profusion, blanketing a sloping hillside with shadowy blue mingling with the gold of the poppies over a wide area. This flower lasts from early spring until well into the summer. It is similar to the larkspur which also adds its blue and white blossoms to the countless numbers adorning the country.

Blue would seem a prevailing color. There are the marianas, called California bluebells or baby blue eyes, from the deep Yale-blue of its delicate petals, which is found in more sheltered places and not so abundant. Then the chia, or rough leaved sage, a small feathery flower in ball-like clusters around a single spike and consisting of from one to four heads. Blooming later, its waves of delicate blue transform the land as far as eye can see, long after others have faded and gone. After the blossoms fade away the dried spike and heads remain standing, shaking out their small gray seeds over hillside and and plain. These seeds were formerly used by the Indians of California for food, and are very nutritious.

Again we have the owl's clover, or pink paint-brush which blooms abundantly and for a long period, tinting the earth for miles. Others I should like to call attention to are the vervein, or wild heliotrope; the wild coreopsis; tidy tips, a yellow daisy; and the tiny cream cups, of pale yellow. These, with various others less noticeable, shading from deep to pale pinks, blues, yellows, and lavenders are too numerous to mention singly.

But I must speak particularly of the beautiful evening snow. Opening in the late afternoon, it covers the earth with its fragrant white mantle, like feathery snowflakes, to lie in heavier drifts in the lower places, there to watch the night through, only to close again when the morning light dispels the shadows and coaxes the tightly closed poppies to unfold their golden crowns to meet the blazing sun.

To quote from "Ramona" by Helen Hunt Jackson, "Myriads of low blossoming plants, so close to earth that their tints lapped and overlapped on each other and on the green of the grass, as feathers in fine plumage overlap each other and blend into a changeful color." * * * "The countless curves and hollows and crests of hills in Southern California heighten these chameleon effects like nothing in nature except the glitter of a brilliant lizard in the sun, or the iridescent sheen of a peacock's neck."

But even this borrowed description fails before the living splendor of California's hills and plains, where mile after mile of dazzling color rolls in waves over the sun-drenched earth, with always one color predominating. Here a long wave of flaming golden poppies; there the shadowy purple brodiaea or lupin. Now a vast wave of pink or yellow, again mingling harmoniously in flower and hue, they delight the eye and soul of all who are privileged to gaze upon this flower-decked land.

PLANT NAMES AND THEIR MEANINGS—XVIII
ERICACEAE.

By Willard N. Clute

THERE are few plant families more attractive, or more celebrated in song and story, than the Ericaceae or heath family. Spreading in thick-set colonies over vast areas, and covered, during the blooming season, with an abundance of showy flowers, they cannot fail to attract the eye, while the edible fruits which many species produce appeal to nearly all palates. In addition, their curious predilection for acid soils and their ability to flourish in sterile, uncultivated regions make them interesting subjects for investigation.

Although the members of the group have numerous characteristics in common, a sort of flower personality, as it were, which makes the heaths distinguishable from other plants, they nevertheless possess individual peculiarities which render each species easily separable from the others. There are also certain group resemblances that make possible the arrangement of the species in four or five fairly homogenous lesser divisions. In the older books these are usually regarded as sub-families under the general title of Ericaceae but in recent works they are often maintained as separate families. Under the latter arrangement we should have the pepperbushes or Clethraceae, the blueberries and huckleberries or Vacciniaceae, the pine-saps or Montropaceae, the shin-leafs or Pyrolaceae and the Ericaceae, proper. For the purposes of the present study, we shall follow the older classifications.

The genus *Erica*, to which the true heaths and heathers belong, derives its name from the Greek word, *Eriko*, meaning

"to break" in allusion to its brittle branches. Brittleness, indeed, seems to be a family characteristic and the present genus is well selected to lead the group and give origin to the family name. Another genus of heathers is *Calluna* derived from words meaning "to brush or sweep" and refers to the use of the twigs for brooms. Among other names bestowed for some characteristic of the plants, is *Rhododendron* which is literally "rose tree." *Rhodora,* a genus maintained by Britton, but combined with *Rhododendron* by Gray, is, as one might surmise, also derived from the Greek word for rose. Still another genus swallowed by the all-devouring *Rhododendron* of Gray, is *Azalea* derived from the Greek word for arid or dry, possibly because the original species grew in dry places as some of the American species are known to do. This latter genus is kept separate by Britton and in this we choose to follow him. One of the beauties of several codes of nomenclature is that one may select first one and then another genus if he is not hampered by too great a veneration for consistency. The species of *Rhododendron* are called "laurel" and the name of the *Chamaedaphne* genus means "low laurel," but it may be added that none of our laurels are at all closely related to the laurel of classic fame. *Epigaea,* the name of the trailing arbutus genus has a meaning not so very different from the one last mentioned since it means "upon the earth."

The single drooping flower of the Indian pipe suggested its generic name, *Monotropa,* from the Greek for "one" and "turn," and *Monotropsis,* another genus is, of course, "like *Monotropa.*" Closely allied to these two is the genus *Pterospora* which means literally "winged seeds."

The bearberry genus is *Arctstaphyllos.* From the fact that this species inhabits sand barrens and other sterile places

and has fruit that is attractive to the eye but is like ashes on the tongue, one feels that the vernacular name should be "bare-berry," but the word from which it is derived is the Greek *arktos*, meaning bear, and that settles the matter. The latter part of the name means a cluster of grapes.

Vaccinium, a typical berry genus, containing both the blueberries and huckleberries is said by Gray to be of obscure derivation and by Britton to mean blueberry, but other reports have it that it was originally *Baccinium* from *bacca*, a berry, and was made into the word we now use by the substitution of a V for the initial letter. Some authors derive the word from *vaccinius* which means "pertaining to a cow" and in corroboration of this theory point to the fact that some species are called "cowberries." The cranberries, often considered species of *Vaccinium*, are often placed in a genus of their own known as *Oxycoccum*. Since this word means literally "sour berry" the name seems most appropriate. Another plant with an acid name is *Oxydendron* which nearly everybody will translate as "sour tree." Its common name is naturally "sour wood." *Leiophyllum* is from the Greek and means "smooth leaf." For this genus Britton uses the name of *Dendrium* which is simply "tree"though the plants are not tree-like.

It is possibly because so many other species of heathworts are evergreen that the well-known wintergreen has no suggestion of winter in its technical name. Instead it is called *Gaultheria* in commemoration of a certain French physician, Hugues Gaultier of Quebec. *Gaylussacia*, the name of the huckleberry genus, honors a famous French scientist, Gay-Lussac, and the well known mountain laurel is named *Kalmia* for Peter Kalm, a Swedish botanist who traveled in Eastern America in early times and published an account of his ad-

ventures. *Lyonia* is for John Lyon an early explorer of the southern Alleghanies. *Loiseleuria* is for J. L. A. Loiseleur-Delongchamps another French botanist. For this genus, Britton uses the name *Chamaecistus* which means "low cistus" and is thus connected with the name of the rock-rose family. Archibald Menzies, a member of Vancouver's expedition to the West Coast of America, brought home the first specimens of the genus which has since been called for him, *Menziesia*.

Several mythological characters also figure in the names of the heathworts. The group of plants best represented by the little marsh rosemary was named *Andromeda* by Linnaeus for that Andromeda fabled to have been chained to a rock near the sea to be devoured by sea-monster. *Cassiope* another genus is for Cassiopeia the mother of Andromeda. *Phyllodoce* is named for a sea-nymph mentioned by Virgil. The genus now called *Chamaedaphne* was long known as *Cassandra* in honor of the daughter of Priam, king of Troy, and *Leucothoe* was named for the daughter of Orchamus who, according to Ovid, was once king of Babylonia.

If names mean anything, it is likely that the plants in the genus *Chimaphila* might be called the true wintergreens for the name is formed of words meaning "winter" and "to love." Their claims might be disputed, however, by *Chiogenes* which means "offspring of the snow." Although the plant is evergreen, the snow in its name is said to refer to the snow-white berries—a statement which we take the liberty of doubting! *Moneses* is Greek for "single" and "delight" in allusion to the single though conspicuous and pretty flower.

Clethra is the Greek for "alder" from some fancied resemblance of our plant to the European alder which is now difficult to perceive. An equally obscure resemblance of the leaves of certain species to the pear tree accounts for the gen-

eric name of *Pyrola*. The Labrador tea genus, *Ledum*, is borrowed from another European plant, having been named for the cistus or rock rose (*Cistus ledon*) of the Mediterranean region.

The members of the Ericaceae are usually so attractive when in bloom that they appeal to all lovers of the beautiful. The flowers are rarely inconspicuous. Sometimes the blossoms may be minute, in which case they make up the deficiency by appearing in great profusion, at others, clusters of fewer large flowers make the plants noticeable. When in bloom the heaths fairly take the landscape. There are, however, no true heaths, that is, no members of the genus *Erica*, in America, but in their stead and occupying much the same habitats, are numerous species of blueberry. The heaths and heathers derive their names from growing in sterile and remote regions, which are known in the tongues of Northwestern Europe by heath or words of similar sound. From the same word comes heathen which originally had no adverse connotation, but meant, simply, people lacking the advantages of cultivated society. The Old World "heather," *Calluna vulgaris*, has become sparingly established along the New England coast but it has always been so well known in Europe as to have few other vernacular names. The name "ling" sometimes used is a very old Anglo-Saxon term said to have the same meaning as heather. From the use of its twigs in brooms it is occasionally known as "moor besom."

Our American heathers or, as we have noted, the species that approach the heathers nearest in habitat and appearance, are the various species of *Vaccinium*. The members of the group, almost without exception are familiarly called "blueberries" from the color of the fruits, or somewhat less frequently as "huckleberries." The latter is an old term of un-

certain meaning applied to related European plants. As this name is used in America, however, it is regarded as more properly belonging to the allied genus *Gaylussacia*. One of our commonest blue-berries is *Vaccinium Canadense* known from the taste of leaves as "sour-top" and from their texture as "velvet-leaf blueberry." *Vaccinium Pennsylvanicum,* a rather diminutive plant, is "low sweet blueberry," "early sweet blueberry" and "sweet juniper-berry." The "high blueberry" or "swamp blueberry" is *V. corymbosum* and it is also called "high-bush blueberry" and "giant whortleberry." This last name is apparently derived from an ancient name for a small bush and is in common use in the Old World to designate an allied species of *Vaccinium*. *Vaccinium atrococcus* is the "black blueberry" if one can imagine such a contradiction of terms. Occasionally it is called "black high blueberry." Still another "black blueberry" is the variety *nigrum* of *V. Pennsylvanicum*. The "late low blueberry" is *V. vacillans*. *Vaccinium myrsinites*, a southern species with persistent leaves, is the "evergreen blueberry." The "bog bilberry" *V. uliginosum*, is a plant common to the northern parts of both Hemispheres. It has been suggested that "bilberry" is but another form of "bull-berry," given to distinguish this species from the "cow-berry." The term "blaeberry" applied to our plant is the Scotch for blueberry. "Bog blueberry" and "bog whortleberry" are other names for the plant. *Vaccinium caespitosum* is the "dwarf bilberry."

If the derivation of *Vaccinium* from the Latin word for cow is correct, we might consider *Vaccinium vistis-Idaea* as the typical species for its most common vernacular name is "cow-berry." It is found in cold and elevated regions on both sides of the Atlantic and such names as "wind-berry," "wine berry," "ling-berry," rock cranberry," mountain cran-

berry" ae self explanatory. From the color of the fruit the species is known as "red bilberry," and "red whortleberry." The term "flowering box-berry" indicates a confusion of this plant with the true box (*Buxus*) or perhaps is merely a reference to the similarity in the leaves. "Fox-berry" may have been given the plant in allusion to its inhabiting wild and rocky places, but the name sounds suspiciously like a variation of "box-berry." A southern Vaccinium that often attains tree-like proportions is *V. arboreum*. It is sometimes called "tree huckleberry," but more often "farkleberry" or "sparkleberry." The significance of these names is so obscure that even the dictionaries are silent on the subject. Our species is often called "winter huckleberry" and "gooseberry," the latter name, of course, mis-applied. *Vaccinium stamineum* is also called "gooseberry" with slightly more reason for its fruits are greenish like those of the true gooseberry. The plant, however, is more often called "deer-berry" and "squaw huckleberry," the last name doubtless applied in a disparaging sense for the fruits are scarcely edible. "Dangleberry" was probably given the plant because the berries hang down beneath the leaves. *Vaccinium melanocarpum* is the "southern gooseberry."

Turning to what are regarded as the true huckleberries (*Gaylussacia*) we find that they are more often black than blue and the seeds, though hard are so brittle that they crack and snap when the berries are being eaten. *Gaylussacia baccata* is naturally known as "black snaps," and "crackers." This is also another of the "high bush huckleberries" and is also known as the "black huckleberry." Another "dangleberry" or "tangleberry" is *G. frondosa*. This species is also the "blue tangle." *Gaylussacia ursina*, on the strength of the specific name, is the "bear huckleberry" but it is not to be

assumed that bears confine their attention to this single species —they relish any of them. The "box huckleberry," according to the books is *G. brachycera* though in the localities where it grows it is known as "juniper berry." *Gaylussacia dumosa,* because of its small size, is the "bush huckleberry," "dwarf huckleberry" and "gopher berry."

Although many botanists include the cranberries in the genus *Vaccinium,* they are always given a separate section and not infrequently this section is raised to generic rank as *Oxycoccus.* Following this latter course, our small cranberry is *Oxycoccus palustris.* It is found in the Old World also and is called "crane-berry," "cran-berry," "crone-berry," "crowberry" and "craw-berry." It has been assumed that the correct term is "crane berry" since the plants grow in wet places frequented by cranes, but the correct derivation seems to be "cran-berry" from *cran, a marsh.* The plant is also called "marsh-berry," "moor-berry" and "moss-berry," the last name given because the plant usually grows in the moss of moors and bogs. "Sour berry" and its variation "sow-berry" are intelligible as is also "swamp red-berry" and "European cranberry." The larger cranberry (*Oxycoccus marocarpum*) is found only in America, and is naturally the "American cranberry," and "large cranberry." Among its other names are "marsh cranberry" and "bearberry," the latter term a misnomer but one that is readily suggested by the size and habit of the plant. The "southern mountain cranberry" is *O. erythrocarpum.*

There are probably few American heathworts with a longer list of vernacular names than the "bearberry" (*Arctostaphyllos uva-ursa*). The plant is a conspicuous one in desert-like places and has medicinal properties as well which insures a variety of common names made by the very common people.

As noted in another part of these studies, this is truly the "bear-berry." The generic name means a bear and a cluster of grapes, and the specific name means grapes and bear so that the derivation is doubly certain. Among common names are "red bearberry," "bear's grape," "fox plum," "bilberry," and "barren bilberry." "Univese-vine" and "uversy" are attempts of the unlettered to pronounce the specific name. In the drug trade, by the way, the plant is called "uva-ursa." The rather large bright red and attractive fruits are devoid of juice which accounts for "meal-berry" and "meal plum." Such names as "rock-berry," "crow-berry," "upland cranberry," "hog cranberry" "wild cranberry" and "mountain cranberry" are self-explanatory and mostly indicate a confusion of this with the true cranberry. "Box-leaved wintergreen" is descriptive of the plant, though suggesting the aromatic wintergreen, while "barren myrtle," "ground holly" and "mountain-box" embody in different forms the idea that the plant has small, firm evergreen leaves. The term "kinnikinik," applied to this plant is of Indian origin. It was used by the aborigines for numerous plants adapted to smoking. We are unable to supply the meanings of "bralins," "rapper-dandies" and "creashaks"—if they have any! The only other *Arctostaphyllos* with a vernacular name is *alpina* which is known as the "black bearberry."

The only species among the heathworts that excels the bearberry in the length of its list of vernacular names is another medicinal plant commonly known as "wintergreen" (*Gaultheria procumbens*) but which is often named the "aromatic wintergreen" to distinguish it from other plants of similar appearance. The pungent oil that permeates all parts of the plant give reason for names like "spice wintergreen," "ginger-berry," "spice-berry," "mountain tea," "Canada tea,"

"tea-leaves" and "tea berry." The bright red berries which, with the thick shining leaves, remain upon the plant all winter are responsible for "one-berry," chicken-berry," "partridge-berry," "deer-berry," "ground-berry," "creeping wintergreen," and "spring wintergreen." "Eye-berry" probably alludes to the eye-like markings on the fruit made by the calyx. "Ivy-berry" may be a reference to the leaves but it may also be a variant of "eye-berry." "Ivory-plum" has the same derivation, probably. "Checkerberry," very frequently heard in New England is of unknown origin but it is conjectured somewhat doubtfully to have been originally "choker-berry." If "proclam," "pippins," "jinks," "chinks," "drunkards" and "red pollom" are anything more than children's names for the plant, I am at a loss to account for them and would welcome suggestions. This is also another of the "kinnikiniks."

Abundant Stomata.—A leaf of *Urgines maritima* (sea onion), 1320 millimeters long and 35 millimeters wide (the width was found by eleven measurements 120 millimeters distant from each other), having therefore a surface of 46,200 square millimeters was examined for the number of stomata it possessed. A small piece of its lower epidermis was put on a slide and its size exactly measured. In a piece 16 millimeters square 80 stomata were found or five in each square millimeter. Multiplying the number of square centimeters in the under surface of the leaf by five, we find that there are present in it no less than 231,000 stomata, an astonishing number, indeed. It may be added that the upper side of the same leaf showed a similar number of stomata.—*Edo Claassen, Cevleland, Ohio.*

THE QUEST OF THE BLUE DANDELION

[Note: The following anonymous essay appeared in the *Atlantic Monthly* for December, 1922. It was from the whimsical pen of former Senator Roger Sherman Hoar, late of Concord, Massachusetts, and now of South Milwaukee, Wisconsin. It is the article referred to by Mr. Norman Jefferies in our number for August, 1923. Since this essay appeared matters have moved swiftly with Senator Hoar's dandelions as he will relate in our next number in a sequel entitled "More Blue Dandelions."]

First, let me state that there really are such things as blue dandelions. It came to pass in the following manner:

In the summer of 1913, a certain country gentleman, living in a certain Massachusetts town, and actuated by the commendable New England urge to buy everything that 'jined' him, purchased an adjoining estate, which happened to be a nursery garden. Instead of merely ploughing under such plants as he did not need for his own garden, he very public-spiritedly threw the grounds open to his friends and neighbors, to take what they chose; and I, *inter alios*, availed myself of the opportunity.

Among the items which I took was one peculiar small plant with lily-like leaves. There were no others like it in the garden, and it could not be identified by any of the botanists to whom I showed it.

Transplanted into my own garden, it received the most tender daily care, in spite of which (or, perhaps, because of which) it very nearly perished. Finally it bore a single flower, large and blue, closely resembling that of an aster. In due

time this lone flower went to seed, producing to my surprise a dandelion-blow as large as a tennis-ball. Then the truth dawned upon me that I had actually discovered the fabulous blue dandelion!

Of course, the thing to do was to wrap the blow in a piece of gauze and save the seeds. But, alas, procrastination is the thief of blue dandelions! By the time I got around to doing it, the blow had fallen (that is, the blow had blown), and only one small seed remained. The next summer neither the seed nor the original plant came up, and the blue dandelion was lost to the world.

The following year, while touring in the Berkshires, I came upon a field of dandelions in seed. There were no flowers, it was true, but there could be no mistaking the lily-like leaves and the tennis-ball blows. Stopping the car, I eagerly crammed my pockets full of the precious seeds. On my return home, I planted a whole bed of them, and was overjoyed to have them all come up.

But this plant is a biennial. I should have to wait until the following June for the flowers. All summer I tenderly tended the bed. In the fall I matted it well with straw. In the spring the plants were still alive. Oh, joy! Tiny buds appeared. They grew and grew, and finally the longed-for day arrived. They burst into flower—bright yellow!

Nothing further occurred in my quest until June, 1918, when I was stationed at Fortress Monroe, Virginia. Walking along Buckroe trolley-line one day, near Old Point Comfort College, I found a small clump of blue dandelions in full bloom. I was not to be cheated this time, for these really were blue; I saw them in flower. In a few days they would be in seed, and then I would return and my quest would be at an end.

In a few days I did return. But, alas, the trolley company had mowed the right of way, and my blue dandelions were no more.

The next spring found me still stationed at Fortress Monroe, in spite of frantic efforts to get overseas. But, just before dandelion time, I was transferred to another post, and in the haste of packing forgot to arrange for someone else to get the seeds for me.

In June, 1920, and again in 1921, I wrote my borther officers at Fortress Monroe, beseeching them to walk out toward Buckroe and get me some blue dandelion seeds; but my appeals produced merely ribald inquiries from some as to whether blue dandelions would be any more useful in violating the Volstead Act than dandelions of any other color. One friend did finally have the decency to take the trip, only to report that the trolley company had filled in its right of way with cinders, thus covering up the spot where the precious flowers had used to grow.

Nothing daunted, I again appealed in 1922, this time including the Reverend Father Superior of Old Point Comfort College. He succeeded in finding a clump of blue dandelions which had not been buried by the unintentional vandalism of the trolley company; but he also succeeded in losing my letter of inquiry.

Nevertheless, realizing the seriousness of the situation, he made a frantic effort to reach me. The letter which he wrote me had my name wrong, the name of my company wrong, and it was addressed to the wrong city. Yet through one of those strokes of genius of the Post Office Department, which one reads about, but seldom sees, the letter reached me; and I at once ordered a shipment of the seeds.

But apparently there was more than one divinity shaping my ends. The very next morning, as I was walking along the railroad tracks in South Milwaukee, on my way to breakfast at the Bucyrus Steam-Shovel cafeteria, I spied a clump of blue dandelions in full bloom.

Now, if I had not just heard from the reverend father, this sight would have filled me with supreme joy. But, as it was, it came as a sort of anticlimax. It was as if Sir Galahad, after nine weary years of search for the Holy Grail, had returned home successful, only to find all the five-and-ten-cent stores displaying hundreds of Grails in their windows.

But there was this consolation: these C. & N. W. dandelions were n't exactly blue—they were more of a purple. Then a horrible thought struck me! Perhaps my memory was at fault after all these years, and the original blue dandelions hadn't been a true blue!

Anyhow, I have collected the seeds and destroyed the plants. With these seeds and the ones received from the reverend father, I may be able to establish a monopoly, after all.

My quest is at an end? Perhaps. And yet I cannot help feeling that there's many a slip between the seed and the blue dandelion. Something may happen to my crop. I may yet be sorry that I have burned my dandelion plants behind me; that I have killed the plants that bore the golden seeds.

CONSPICUOUS TROPICAL PLANTS

TRAVELERS in the Tropics, are always impressed by the curious forms of vegetation there encountered, but their reports of such things seldom include more than a casual mention of the species that interest them with perhaps some notes of their abundance. It is a rare occurrence for the tropical botanist to tell anything about the conspicuous features of the plants he discovers. The following account of some phases of Hawaiian vegetation, by Dr. A. B. Lyons, though published a long time ago, gives more information in such matters than is usual and is well worth a second appearance in print.

One will find in Honolulu very few plants belonging to the aboriginal flora of the islands. Even the grasses and the weeds are nearly all exotic. The few "indigenous" trees occasionally planted are after all not aboriginal, having been brought from the Polynesian islands further south by the first settlers. Very few species peculiar to the Hawaiian Islands are to be found anywhere except in the forests of the interior, where such species mostly originated. A few only of the 135 or more native ferns are commonly planted in gardens. The one that will particularly attract attention is the bird's nest fern (*Neottopteris Nidus*), which is frequently placed in the crotch of a branching tree trunk, its favorite location in its habitat. One would not recognize it at first glance as a fern at all. Its fronds are quite entire, three to five feet long by five to seven inches wide, forming a regular crown. The foliage is rather that of an endogenous plant like the banana

than a fern, but the spores growing on its under surface betray it.

The tree ferns, *Cibotium* and *Sadleria,* which abound in the forests and which are peculiarly Hawaiian species, you will rarely see in cultivation in Honolulu. They do not thrive in so dry a climate. This is unfortunate, for nothing could be more ornamental. The finest of them is the pulu fern (*Cibotum Chamissoi*), whose uncoiling young fronds are clothed with a glistening silky capillary chaff of an old gold color, fine and soft as the finest wool; formerly collected under the vernacular name of pulu for filling pillows and mattresses—the same thing that in Sumatra is known as pengawar djambi or paku kindang, used by surgeons as a haemostatic. The fern trees in the forests of Hawaii have trunks six to fifteen, even twenty feet high and six to ten inches or more (even two feet) in diameter.

Among the indigenous trees occasionally seen in Honolulu is the bread fruit. The young trees are very beautiful while they retain their symmetrical pyramidal form. The ample dark green rigid leaves, more than a foot long, pinnately lobed, make a very dense shade, and suggest the idea of extraordinary vigor of growth, which is further impressed by the great green globes of its fruit. In the older trees the beauty of symmetry is lost, but there remains an air of sturdy self-assertion which seems to excuse their grotesque ugliness.

Another tree, doubtless imported like the bread fruit, by the aborigines, although now one of the most common of the forest trees, is the ohia or mountain apple (*Eugenia Malaccensis*), occasionally planted in Honolulu, but not happy where there is so little rain. A noble tree it is, with its large, oval deep green, shining leaves, and the scarlet tassels of its numerous blossoms, but it is when the fruit is ripe that the tree

is in its glory—great clusters of the deep red, luscious-looking "apples" clinging about its branches and larger limbs everywhere. Juicy and refreshing the fruit is, but rather insipid.

Conspicuous among the trees planted for shade in the city, as well as in its native haunts in the valleys of the interior, by the paleness of its silvery foliage, is the kukui or candlenut tree (*Aleurites triloba*). The fruit looks like that of our black walnut, but is larger and frequently contains two nuts. These are nearly as large as the English walnut, with a shell as hard as that of a hickory, from which are carved effective ornaments, black as jet and capable of receiving a high polish. The kernels are very oily and were used by the natives to make torches, being simply strung on a thin splint of bamboo, whence, to this day, a lamp is in the vernacular an ipu kukui.

Another native plant, abundant in the mountains, you will often see planted for hedges, a *Dracaena*, more properly *Cordyline* but with green, not red or variegated foliage. The natives call it "ti" (pronounced like our word tea), and find many uses for it. The roots, which are three to six inches thick and several feet long, are baked or steamed in imus or underground ovens, sugar being produced abundantly in the process, although none is present in the uncooked root. The baked root is eaten, or rather chewed like sugar cane, and the juice sucked from it, but the principal use made of it by the natives is to produce okolehao, a kind of whiskey. The leaves take the place of wrapping paper in the fish market or grocery store. Haolis (white people) make a bungle of putting up packages with it, but the native Hawaiian is very dexterous in its use, and the imitative Chinaman succeeds equally well. The Hawaiian shows the same kind of dexter-

ity in fashioning an extemporized drinking cup from a taro leaf.

Banana trees are everywhere to be seen, but not generally planted for ornament. The trade wind blows too constantly to allow them to keep a whole leaf more than a day or two, unless under shelter of a house. The stranger is surprised at the variety of bananas, as different from one another as the varieties of pear or apple. Some grow on small "trees," not more than six feet high; others run up fifteen, twenty and even twenty-five feet. The rapidity of growth is something amazing. Cut off the trunk of a half-grown plant; you find that it is made up simply of the sheaths of leaf stalks, the center occupied by the coming leaf, which immediately begins to push forward, so that in a few minutes it projects noticeably, and in half a day it will have grown out several inches.

Your guide will point out to you as the traveler's palm a plant which your botanist's eye will recognize as a banana rather than a palm. Unlike the common banana, it is a branching, perennial plant, and—another point of contrast—its great banners of leaves are so tough in texture that they are but little split to pieces by the wind. The flower clusters are lateral, not terminal and the bracts are persistent, so that the fruit is concealed from view. You find, however, that it resembles a banana in shape, although only four inches long. But the part of the fruit which in the banana is the edible pulp, is tough and horny, and your curiosity to know what is inside subsides after you have tried your knife on it a while. You will make a mistake, though, if you throw the refractory thing away. Take it home and let it lie a day in the sun, and you will find that your curiosity was justified. The tough fruit yields to the persuation of the sun

and splits into three valves, which spread and recurve, revealing one of nature's marvels. Each valve is found to hold two lines of seeds, each enveloped in a fantastic flannel jacket of a deep clear blue. What for? That is more than I can tell, but the bony bananas make very pretty ornaments in a botanist's collection.

There is nothing beautiful about a guava tree (*Psidium guaiava*) except its pretty, white, rose-like flowers and its profusion of golden yellow, lemon-like fruit. The foliage is coarse and often disfigured by a black fungus growth, the habit straggling. It is rarely planted, but grows spontaneously, forming over extensive tracts a dense chapparal. Thousands of tons of the fruit go to waste every year. The plebian guava has an aristocratic cousin, called the mandarin guava, which forms an ornamental tree of considerable size, its trunk and branches smooth from exfoliation of the bark, its foliage of rather small obovate, thick, shining coracious leaves; the fruit small and quite acid. Very similar to this in foliage is the strawberry guava, a small shrub; the fruit globular, an inch or less in diameter, red and of an agreeable flavor and borne in frequent, abundant crops. The orange family is well represented, of course; the trees, orange, lime, lemon, shaddock, Chinese orange, citron, etc., having a very strong family resemblance, and all ornamental, particularly when in fruit. The trees naturally have a more luxuriant growth than in California but are not more prolific.

(*To be Continued.*)

NOTE *and* COMMENT

GASTERIAS.—A little knowledge is not only a dangerous thing but it paves the way to numerous surprises. Some years ago, a friend gave me a little plant that she said was a cactus and although it was very unlike any cactus I had ever seen, I took her word for it and treated it accordingly, giving it gritty soil and a scant supply of water. Under this treatment it throve amazingly soon outgrowing the parent plant and sending out of its spiky heart a long, snake-like stem hung with tiny bells. These flowers should have opened my eyes but being busy with other things I gave them scant attention and it was not until I visited the Botanical Gardens in New York that I discovered my so-called cactus was a *Gasteria,* a member of the lily family. Well, of course when my attention was called to it, I saw that the tiny blooms did bear a family resemblance to Solomon's seal and others of that ilk, but who would ever suspect the spotted dagger-like thing (whose nickname in our family is "spikes") could be a lily? After making this discovery, my first impulse, of course, was to give it richer soil and a more generous supply of moisture, but here Common Sense raised her hand and suggested that as the plant was doing so well on its scanty fare, it would be folly to make any change in treatment, so the soil is unchanged and the water supply only slightly increased. The plant is much finer than any specimen I saw at the Gardens so I must have unwittingly stumbled upon the right treatment. I would like to know more of this particular branch of the lily family, but have not been able to find out much about it. Could we have

an article in the *Botanist* about it? I have a hazy idea that there has been such an article but cannot find it though I have the numbers for several years back.—*Idella Prescott, New Hartford, N. Y.* [The species of *Gasteria* are seldom seen in ordinary gardens, for all the species are evergreen succulents that require a greenhouse for their protection in the cooler parts of the world. They are, however, often found as house-plants in cottage windows and generally pass for cacti. The species are very closely related to the species of *Aloe* and by many botanists are still placed in the latter genus. All are natives of South Africa and should be given about the same treatment in cultivation as is given Aloes. In their native habitats the plants are found in desertlike regions and therefore require very little water for growth. They usually flower in our region in winter.—Ed.]

Red-seeded Dandelion.—Dr. Bessey's report on *Taraxacum erythrosperum* in Michigan indicates that the plant is becoming abundant about there. I have been watching the species at Fargo since 1910 and believe there is no noticeable increase. The plant does not occur in the city or but very rarely. In and near the woods of the river it is quite common. At Manhattan, Kansas, about 1906-09 I observed it to be common along the streets and have reported (Am. Mid. Nat. 5:118) plants of it to begin flowering 8 days earlier than any of *T. officinale*. This was from plants along the walk kept under observation until fruit was mature. In 1907 I noted "*Taraxacum* in fruit up to Apr. 20 is mostly *T. erythrospermum*." The first fruits had been noted on Mar. 31 and of *T. officinale* on Apr. 5. At Fargo I have been unable to follow it so closely. The past spring, however, I made a few observations on the two species growing together, and the first of each seemed to come into flower at the same date. I have

scarcely any fall records. At Manhattan, flower heads of *T. erythrospermum* were noted Nov. 11 and Dec. 15, 1916 with the additional note: "This has flowered abundantly this fall but I have not seen any flowers of *T. officinale.*" At Fargo I have not watched *T. erythrospermum* in the fall. At the present writing (Oct. 7) a brief survey failed to show flowering or fruiting heads of it although *T. officinale* is flowering quite freely.—*O. A. Stevens.*

Milkworts—Some plants are called milkworts because of their white juice or latex, others because they promote the flow of milk in animals and still others because they curdle milk and thus may be of use in cheese-making. The classic milkwort of this latter group in *Pinguicula vulgaris* which, in spite of its use, is still called butterwort. Among others of this class are the buttercup (*Ranunculus bulbosus,*) shepherd's purse (*Capsella bursa-pastoris,*) the narrow-leaved plantain (*Plantago lanceolata,*) the nonesuch (*Medicago lupulina*) and the artichoke. The Poylgalaceae commonly referred to when the word milkwort is used, do not curdle milk.

Johnny Appleseed.—No history of the apple in America appears to be complete without some mention of Johnny Appleseed, the half-crazy preacher who travelled up and down the Ohio valley about a century ago, scattering appleseeds and pious thoughts by the wayside. The encyclopedias often fail to mention this unique character and in the absence of any very definite information about him, a delightful myth is gradually taking form. His real name seems to have been Jonathan Chapman. He was born in Boston in 1775 and died in the cabin of a poor settler in Allen county, Indiana, in 1847. His last resting place, however, does not seem to be known. His first appeal to public notice was in 1801 when he appeared in Licking county,

Ohio, with a bible in one hand and a bag of appleseeds in the other. He was familiar to the Indians who held him in great awe as a mighty medicine man. He usually travelled barefoot and alone, his religion forbidding him to ride and thus take his ease "at the expense of his poor dumb brother." He occasionally used a horse, however, to transport his bags of appleseeds. He called the apple the "chosen fruit of God" but believed the only way to propagate the tree was by seeds. He condemned the planting of cuttings and regarded all grafting and pruning as positively sinful. He abhorred the taking of life in any form and is said to have wept in pity over the body of a dead rattlesnake which had bitten him and which he had killed in the excitement of the moment.

MATCHES.—Not the kind that are made in heaven, but those which have a more sulphurous composition, are the matches referred to in this note. Of these the world uses five trillions annually, or, since figures are more impressive, 4,675,650,000,000. To furnish the match-sticks which everybody throws away so carelessly after use, large quantities of white pine and aspen are required, and this timber must of course be straight grained and free from knots. According to the Trade Record of the National City Bank of New York, the bulk of the world's matches are made in the United States, Sweden, Japan, Russia, Germany, and Great Britain, the United States, of course, leading all the rest.

INDIAN STRAWBERRY.—Some strange plants were sent to me from Moorestown, N. J.—wild strawberries fruiting in October. The red berry is round with a short neck and looks like the one that comes in June except that the seeds stick out all over and brush off easily. Within, it is spongy and juiceless. Back of the berry are two circles of green: the inner consists of five calyx segments and alternating with

them are larger 3-toothed bracts. The bright berry with its wide green collar is very attractive. The fruit of our common species grows in bunches, but here a single berry arises on a long peduncle among the leaves. Its leaves and manner of running over the ground is similar to our wild strawberry. The books call it yellow or Indian strawberry. It is our only strawberry-like plant with yellow blossoms. It has become naturalized near Philadelphia and in the Southern States. Schuyler Matthews writes in "Familiar Flowers of Field and Garden" that it is not common. He found it once on Staten Island some years ago and has not seen it since. The botanical name is *Duchesnea indica* in honor of Antoine Nicolas Duchesne, a French botanist who monographed the genus *Fragaria* in the early days.—*Nell McMurray.*

Green Rudbeckias.—A note in the *Botanist* for December 1907 tells of mutating *Rudbeckias* one of which had a green center. Dr. Beal suggested that this one should be called a green-eyed Susan. Many somewhat similar appeared near Sherborn, Mass., last summer and Mr. E. J. Smith of that place writes "The common Rudbeckias around here have been varying wonderfully. . Whole patches of them would have bright pea-green rays. Other flowers would have no rays but only the involucres which were enlarged to look like green rays and still others had in the middle a mass of short green prominences instead of the usual cone. They looked like green plush buttons about an inch in diameter." —*Nell McMurray.*

Name of Flower Wanted.—I wonder if some one can give me a better name for the old-fashioned garden flower that we used to call cup-and-saucer. In a general way it reminds one of the primrose with its rosette of woolly leaves.

The little flowers were clustered like a primrose and were rich red with yellow markings. The center was shaped like a cup and surrounded by a flat limb like a saucer. I never could find them in a catalog and have not seen a plant for years. The plant was a perennial about as big around as a dinner plate and did not grow very tall. I should also like to know the botanical name of an old-fashioned perennial known as London Pride. It looks somewhat like a tall phlox with scarlet flowers and notched petals.—*Nell McMurray.*

[*Dinathus barbatus*, commonly called sweet William is often known as London Pride. It is likely that this is not the flower intended; if not, the plant may be *Silene armeria* which shares many common names with the species first mentioned. Bouncing Bet (*Saponaria officinalis*) is also called London Pride, a good illustration of the uncertainty of common names in designating a species.—*Ed.*]

The Seasons in England.—In a climate with well-marked yearly seasons, different species of an association come to the height of their vegetative growth, flower and fruit at different periods of the growing season. These activities of different species are scattered throught the whole season, but the species tend to fall into distinct seasonal groups. In the British deciduous woodland, for instance, there are four seasonal groups of species and the flourishing of each gives seasonal aspect to the season. Thus we can distinguish the prevernal aspect of early spring (March and the first half or two-thirds of April in southern England,) marked by the coming into prominence of such plants as the celandine (*Ficaria verna*), the wood anemone (*Anemone nemorsa*), and the primrose (*Primula verna*); in the vernal aspect (end of April and May) the trees come into leaf and flower and in the ground vegetation the bluebell (*Scilla*

nutans), stichwort (*Stellaria holostea*), weasel snout (*Galeobdolon luteum*) etc., develop; in the aestival or summer aspect (June-August) a number of other species become prominent; and the autumnal aspect (September-November) shows no fresh flowering plants in the woodland but is marked by the appearance of many fungi.—*A. G. Tansley in Practical Plant Ecology.* [The autumn aspect of British vegetation, if this a true description of it, is far behind our own. It is well-known that the other side of the world has no such wealth of goldenrods, sunflowers, asters, and other composites as we possess but we commonly assume other species to take their places. One can imagine what our autumn would be like with "no fresh flowers in the woodland" after August.—*Ed.*]

Scientific Plant-Lore—There is a risk in recording information about unusual plants and flowers unless one can give first-hand information; otherwise extraordinary statements get into print. For example, John Lindley in his "Natural System of Botany" 2nd Edition, London, 1836, says of the true papaw (*Carica papaya*) "The tree has moreover the singular property of rendering the toughest animal substances tender by causing the separation of the muscular fibers; its very vapor does this. Newly killed meat suspended among the leaves and even old hogs and old poultry when fed on the leaves and fruit become tender in a few hours." Miss Kingsley, indeed, in her book on West Africa reports the same thing but is very skeptical about it. Lindley records other things which need verification. Thus of the horse chestnut "Handsome trees * * * remarkable for their large seeds. These seeds contain a great quantity of starch which renders them nutritive for man and many other animals." Of the China tree (*Melia Azederach*) he says "The pulp that sur-

rounds the seeds is said to be deleterious, but this is denied by Turpin who asserts that dogs and children in Carolina eat the seeds with impunity." Gray in "Field, Forest and Garden Botany" says the horse chestnut is inedible and even poisonous. As to the China-berry, neither I nor any of my companions years ago in Carolina ate them, nor have I ever noticed birds eating them, much less dogs. Can you verify these statements of Lindley's? His most extraordinary information, however is about certain of the Solanaceae. "It must also be remembered that if the fruit of the egg-plant (*Solanum esculentum*) is eatable it only becomes so after undergoing a particular process and that the tomato is always exposed to heat before it is eaten." The common potato in a state of putrifaction is said to give out a most vivid light, sufficient to read by. This was particularly remarked by an officer on guard at Strasburg who thought the barracks were on fire in consequence of the light thus emitted from a cellarful of potatoes." It was firewater that lit him up, I fancy, rather than rotten potatoes.—*Robert A Benton.*

Trend of Development.—Why there should be but two lines of evolutionary development is not clear. Why not other lines, neither plant nor animal? Why is it, that the plant-animal did not evolve into more highly developed organisms, such as motile trees, etc. There does not seem to be any obvious reason why a higher animal could not have developed, with chlorophyll bodies in its skin. The obvious fact is, that up to the present day, at least, the plant animal has not proven to be one of nature's most sucessful experiments. Perhaps, with changing earth conditions, the time may come when true plants and animals will prove too specialized for the new environment, and a new phase of evolution will find the plant animal type dominating the earth.—*Turtox News.*

The possibilities of motile trees is quite attractive but it is probably fortunate that plants have not gone further and like the animals, developed a voice. One might be ravished in spring by the sweet voices of the trailing arbutus and hepatica, but think of the discords that might rise from a lawn covered with dandelions or a field of toad-flax!

The Wasteful Cottonwood.—The behavior of the cottonwood or Carolina poplar at each recurrent autumn never ceases to be a mystery. When other plants merely cast their leaves, the cottonwood rather overdoes the matter by casting many of its branches, also. This wholesale destruction of wood made at considerable expense to the parent tree does not consist merely of the young twigs of the season, but ofter includes branches six or more years old. In a large majority of cases the buds on these twigs contain flower clusters so nearly complete that their outlines may be easily made out in a longitudinal section of the bud.

Western Plant Names.—Regarding the names of plants of western distribution that you have included in parts 2 and 3 of "American Plant Names," *Calypso bulbosa* is often referred to as "Venus' slipper," *Solanuum triflorum* is very commonly called "wild tomato" by ranchers and others and *Symphoricarpos occidentalis* is known variously, and often incorrectly of course, as "stag-berry," "quail-berry," "Juneberry" and "partridge-berry." The name "buck brush" or bush is applied to several low intricately branched shrubs the name varying in application in different localities. Have you omitted the name kinghead from the list of appellations of *Ambrosia trifida?* I have seen this used a great deal in agricultural literature. Now as to the species of *Artemisia.* I do not believe any of them are ever called "wormwood" by westerners, all of them are "sage." *Artemisia frigida* is

"Rocky Mountain sage" or merely "mountain sage." *A. ludoviciana* is often called "wooly sage" and *A. tridentata* is called "black sage" about as often as "sage-brush." *Aster multiflorus* is often called "button Aster." I knew *Brauneria purpurea* as "niggerhead," and Clements gives "golden eye" for *Chrysopsis villosa*. *Gaura coccinea* is called "butterfly weed" in Montana. *Oenothera pallida* is generally called "tall white primrose" to distinguish it from the stemless species which are locally called "rock lily." I believe you, or rather the authors you have at hand, have confused *Gutierrezia* and *Bigelovia*. The common name all over the west for the former is "torchweed" or "matchweed," not as one might suppose from the abundance of bright yellow flowers but from the readiness with which the dry stems and resinous buds burn in the spring. Sometimes it is called "horseweed" because nothing but horses will eat it. Some authors give "brown weed" but I have never heard it called that name, am of the opinion that it is a corruption of "broom weed." The plant was actually made into coarse brooms by the early pioneers. "Rabbit-brush" or bush refers in common parlance of the west to the various species of *Bigelovia*. "Rabbit-weed and "rayless or false goldenrod" are less frequently used. *Glycerrhiza lepidota* is said to be called "Deseret weed" very commonly in Utah. And now does anyone know positively what plant Zane Gray meant by "purple sage?" I have half a dozen candidates for the honor, various species of *Atriplex*, *Salvia* and *Artemisia*.—*Mrs. M. E. Soth.* [This note is an excellent illustration of the way in which some common names get into print while others fail. Botanical authors are likely to give to each species the common names they have heard applied to it. At the same time there are often numerous other names in common use of which they are entirely ignorant.

One of the objects of the observations on common names appearing in this magazine, is the bringing to light of these additional names.—Ed.]

Flowering Habit of Tamarix.—What are the flowering habits of the tamarix? I have noticed that two bushes of *T. gallica* on the campus have flowered twice during the season the last two years. I am wondering if this is a regular habit of the plant since a brief survey of available literature seems to throw no light on the subject. Last year I did not make a note of the date of the first appearance of flowers but remember that the plants were in full flower on June 19. When they flowered later in the summer I recorded the date —August 4. This year I have June 14 as the first of the summer period, and August 5 as the second. The weather has been quite different during the late summer of the two years, warm and very dry last year, considerable cool and rainy weather this year. As to the amount of flowers I cannot say, probably not so many in the second period but hardly a great difference.—*O. A. Stevens.* [A tamarix received from Siberia through the United States Plant Introduction Bureau under the name of *Tamarix pentandra* has bloomed twice a year for several years in our grounds; in fact it appears to bloom fairly continuously through the summer, though not as profusely as at the beginning of its flowering season. It may be added here that in the valley of the Rio Grande in New Mexico, the *Tamarix* is commonly used as a shade tree often reaching a height of 30 or 40 feet and blooming profusely as late as August. This species is *T. gallica*.—Editor.]

Amphichromy again.—The interesting note in the *American Botanist* for November, 1923, about four-o'clocks with flowers of two separate colors on the same plant, calls to my mind a case of amphichromy (thanks for the word, it is

a new one to me) which I have observed in the shrubby monkey-flower of Southern California (*Mimulus glutinosus*). Normally the blossoms of this beautiful wilding are buff or salmon, but sometimes plants are found with narrower leaves and red flowers. These are classed either as variety *puniceus* or as a distinct species of this name. Near Pala and at some other stations in or bordering the San Luis Rey valley, a remarkable form of the shrubby mimulus occurs bearing flowers exhibiting a range of color on some plants from buff through orange and scarlet to a deep mahogany crimson on the same bush. This amphichromatic habit seems to be a confirmed one, as the same striking display of bloom was to be seen when I visited the neighborhood a couple of years ago after an absence of some years. In the hope of seeing what effect cultivation might have I made some cuttings, but they failed to root.—*C. F. Saunders, Pasadena, California.*

Desert Holly.—So long and intimately has holly been connected with the Christmas festivities that the season is no longer considered complete without this plant or some form of vegetation resembling it. In the far West the Christmas berry or toyon (*Heteromeles arbutifolia*) often does duty for its more famous prototype and in the desert regions of the Southwest a species of atriplex (*A. hymenelytra*) with silver-gray, holly-like leaves is much used under the name of desert holly. It is said that a considerable trade in this plant is growing up, not only in its native region but in the eastern market to which it is sent in carload lots.

EDITORIAL

A little thought on the matter ought to convince anybody that it is impossible to make a common name for a plant. A species may have any number of vernacular names, that is, names in the common tongue, but unless one of these comes into common use it cannot properly be called a *common* name. A good many plants have no common names and are not likely to have any for they are so insignificant that the general public has never heard of them. The name-tinker, however, is never satisfied to let well enough alone and oblivious to the fact that there is a reason for every common name, attempts without reason to supply names for such plants as lack them. It may be said without fear of contradiction, that common names in general are an unmitigated nuisance. They are never as accurate as the technical names and at times are actually misleading. Because the technical names are unfamiliar, it has become a fad to regard them as difficult to pronounce and hard to remember. Such technical names as chrysanthemum, rhododendron, pentstemon, delphinium and nicotiana in everyday use is sufficient evidence that there is no inherent difficulty in using the more accurate terms. When a plant has a real vernacular or common name, however, it may be worth studying for it actually contains some element of folk-lore, poetry, mythology, and the like, but the same cannot be said of the "English" names which are usually mere translations of the scientific names whose only point of interest, is in showing how matter-of-fact the translators are.

The great majority of our really common names originated in Europe and have been imported with our language. Since the genera on both sides of the Atlantic are pretty much alike, we have simply adopted the vernacular generic name and have added a distinguishing adjective to indicate the American species. Such common names as are wholly of American origin were not devised with the idea of giving the plants common names, but are the names by which hunters, explorers and the early settlers called them for want of something more definite. Occasionally, however, a manufactured name has clung to a plant when such name was apposite, as foam-flower for that plant otherwise known as false mitrewort. Among suggested names that have been extensively adopted may be instanced Christmas fern given to a common species of wood fern by John Robinson, half a century ago, and boulder fern, offered by the writer for that species "damned by faint praise" as the hay-scented fern. Jack-in-the-pulpit is said to have been invented by Clara Smith and first named in a poem published in 1874 which had the distinction of being revised by Whittier. In general, however, the use of common names, even in ordinary conversation, is to be deplored. They are really plant nicknames no more to be tolerated in good society than shorty, red, slim, fatty, and similar outcasts.

BOOKS AND WRITERS

After nineteen years of publication, *Nature Study Review* has succumbed to the fate the sooner or later overtakes magazines devoted to natural history. * * * It has been merged with the *Nature Magazine* of Washington, now beginning its second successful year. * * * Well, we are sorry to see an old publication go, but the new magazine

is a good one. * * * The *Gazette* of Germantown, Pa., is publishing a series of fern articles under the direction of the noted Pteridologist, James G. Scott. * * * The first number discusses *Aspidium laserpetiifolium* and reprints an illustration from *American Botanist.* * * * Books relating to plants are increasing in number. * * * Herbert Durand has recently issued a volume on "Taming the Wildings" and Norman Taylor has put out the first part of a work devoted to the vegetation of Long Island. * * * The latter is a study of the vegetation of Montauk at the extreme eastern end of the island. * * * The region was once one of our favorite botanizing grounds. * * * "The Cultivated Evergreens" is a composite work edited by L. H. Bailey which contains contributions from a number of specialists. * * * F. V. Coville discusses acid soil for broad-leaved evergreens. * * * These volumes, however, do not much increase the total number of available botanical works for Henshaws's "Mountain Wildflowers of America" has just gone out of print and so has Clute's "Fern Collector's Guide." * * * Several other books regarded as permanent fixtures in botany are on the verge. * * * Those who expect to own copies should heed the old adage to "Git while the gittin' is good." * * * The U. S. Department of Agriculture has issued a list of local names of migratory Game Birds. * * * It performs the same service for these birds that "American Plant Names" is performing for the flowering plants. * * * Two more fascicles of L. H. Bailey's "Gentes Herbarium" have come to hand. * * * One is concerned with the species of *Rubus* and their taxonomy and the other discusses the names of various cultigens. * * * What is a cultigen? * * * Well, it is what Bailey calls a cultivated plant that has de-

parted so far from the original species as to need a significant name to designated it. * * * Lettuce and cabbage, for instance, are not at all like their wild ancestors. * * * Among domestic animals the cultigens are often still less like the originals. * * * Somebody has said that the pug-dog has varied so far that it is not only a different species but a different genus! * * * Not to mention the dachshund which is "a dog and a half long and only half a dog high." * * * Illinois has a new law protecting some of the wildflowers. * * * If you knowingly buy or sell any bloodroot or columbine taken from the lands of another in this State you may have to pay a fine of $100. * * * Among other plants protected is the insignificant *Trillium sessile*. * * * *Cypripedium hirsutum* is also included among protected specimens but the law will have to be amended before it will protect any plant by this name. * * * Britton calls the yellow lady-slipper *Cypripedium hirsutum* and Gray bestows the same name on the tall pink and white species. * * * Here is a good chance for the botanist to be called in as an expert witness. * * * A new textbook and manual of botany for beginners by the editor of this magazine is soon to appear. * * * Its claim to distinction it that by its use one can learn all about botany without a teacher. * * * Well, we shall see!

More than eight years ago, representatives of six important societies interested in gardening, acting as the "Joint Committee on Horticultural Nomenclature" undertook the herculean task of preparing a list of standard names of plants "in the trade" with a view to facilitating commercial transactions. The results of their labors have just come to hand as a volume of 458 pages with the title of "Standardized Plant Names." This is a list of more than forty thousand entries,

alphabetically arranged, in which technical names, vernacular names, and synonyms are indicated by distinct faces of type. The fact that the societies concerned, which include practically all American dealers in plants, have agreed to use the names listed for at least five years, makes this one of the most important books relating to plants ever issued. Those immediately in charge of the work are Frederick Law Olmsted, Frederick V. Coville and Harlan P. Kelsey, but in compiling the list they have had the advice and assistance of more than fifty specialists, and the work has proceeded without reference to the various "codes" so dear to the heart of the technical botanist. In general the effort has been to select the names by which the plants have been most widely known in the trade and thus the dealer finds his customary usage backed by authority. The undertaking is one that has long been suggested by intelligent plantsmen and a similar course might be taken with reference to plants in general with good results; indeed, the various lists of *nomina conservanda* adopted by the code-makers are recognitions of this principle. Though the technical names in the new list are likely to be widely used, it may be doubted whether various other proposals made in the book will meet with as ready acceptance, especially those not in harmony with current English use, such as the telescoping of adjectives with the nouns they qualify to make "common names" and the omission of the apostrophe in such names as Henry's St. John's-wort. It is difficult to see how crepemyrtle, possumhaw, wildbergamot and pinkscalegayfeather are any improvement over the usual way of writing them. To be sure the last mentioned name is cut in two in the middle but by the rules of the game it should not be. Nor can we see how Welsh-poppy is less entitled to a hyphen than Chinese-poppy. In

the selection of common names the committee has been unfortunate in a considerable number of instances as when "blooming Sally" is offered in place of the widely-known willow herb, "snap-weed" for jewel-weed, "potato-bean" for groundnut (*Apios*) and "trout lily" a fanciful name coined by Burroughs for the dog-tooth violet or adder's-tongue. The great white trillium appears as "snow trillium" though *Trillium nivale* rightly bears this name. The plantain-leaved everlasting is called "pussy-toes" in the list but it is doubtful if the nurseryman can work up enough sentiment to call it by this name. He is more likely to indicate it by another of its names, "moonshine," and thus, at least, be up to date. The list even gives "Chamaedrys Germander" although germander is but another form of chamaedrys. It might also be pointed out that "crow barberry" is not an adequate translation of *Berberis empetrifolia,* nor puzzle willow for *Salix ambigua.* Nor is *Adiantum capillus-veneris* by any twist "southern maiden-hair" for it grows the world around and extends to Dakota on this side of the world and to England on the other. Except for the manufactured "common names" however ,"Standardized Plant Names" is a worthy attempt to attach a single technical name to each species and one which bids fair to be successful. The technical botanist is not likely to look with favor upon the project since it robs him of half his stock in trade and disregards "priority" which brings him what C. G. Lloyd calls "personal advertising." But the men with money invested in plants can afford to ignore the technical botanist. "Standardized Plant Names" is for sale by Harlan P. Kelsey, Salem, Mass., at $5 a copy. This is probably far below the cost of production. The book is from the press of the J. Horace McFarland Company and is an excellent example of book-making.

That modern plants have descended from ancient and simpler ones is held by practically all biologists, though the exact, or even the approximate, lines by which they have descended are still hidden in obscurity. In an attempt to throw more light on the whole problem of descent, Professor F. O. Bower of the University of Glasgow, has made a most comprehensive inquiry into the morphology and phylogeny of the fernworts, the results of which are to be published in a two-volume work on "The Fern." The group selected for investigation offers an attractive field for study since the forms are easy to distinguish from other groups, are abundant and widely distributed, and have a rich series of fossil remains by which they may be traced back to the ancient times. Professor Bower believes that if the primitive type, from which all the others have descended, can be singled out, it may contribute important data bearing on the descent of land plants in general. In order to visualize this primitive fernwort, each separate character of ferns is examined in detail to decide what are, and what are not, primitive characteristics. A general idea of what the primitive progenitor must have been like is then obtained by uniting these characters into a single hypothetical individual. The features taken for extensive study are the morphology of root and shoot, the vascular system, the structure of the leaf, the dermal and other non-vascular tissues, spore-production, the gametophyte and the embryo. From a consideration of these the author concludes that the simplest fern plant was "a simple, upright, radial, rootless shoot, either unbranched or showing dichotomy." The primitive fern leaf is regarded as being long-stalked with a distal dichotomy of narrow, separate simple-veined segments and the reproductive parts as large solitary spore-cases containing many spores. Com-

paring these specifications with fossil fernworts of the Devonian, a fairly close resemblance between the two is found to exist. It is further concluded from a study of the embryology of the fern that the evidence points toward a filamentous origin for even the most complex sporophytes. In the concluding volume the author purposes to make a more natural classification of the fernworts than has yet been made by reconstructing the phylesis of the Filicales in the light of this new knowlege. Each of the seventeen chapters concludes with a very full bibliography of the subjects discussed and it is a matter of some chagrin that in several of the lists not a single American author is included, and in the whole book, only two or three. The book is a tall octavo of upwards of 350 pages and is exceptionally well printed and illustrated. It is one of the Cambridge Botanical Handbooks, issued by the University of Cambridge and is to be had in America of Macmillan and Company, New York. The price is $7.50 net.

The great number of plants common to the United States and Great Britain makes it likely that two little books on the subject of plant names recently issued in London will find an appreciative audience on this side of the world. In "Plant Names," by T. S. Lindsay, issued by the Sheldon Press, the author has attempted to explain the meaning of the technical and vernacular names of British plants which usually puzzle the novice. There are short chapters on the history of plant naming, on pronunciation, spelling, and gender, on names whose meanings are conjectural, as well as those derived from habitat, use, resemblance to other objects, medicinal virtues and the like. Then follows a descriptive list of the more common specific names with their definitions. Although the book contains less than a hundred pages, the auth-

or has managed to include all the more important terms and has made a very useful book. "British Plant Names and their Derivations" by R. J. Harvey-Gibson, published by A. C. Black and Co., is really a compact little dictionary in which the generic and specific names of British plants are defined and their derivations given. The proper pronunciation of both are indicated. Although it contains but fifty pages, upwards of 1500 terms are included. The price is $1.00. That of "Plant Names" is $1.25. Both volumes are obtainable in America from the Macmillan Co.

The crow is nobody's fool. "Live and learn" is his motto; and he does both but especially the former in a way to excite the admiration of all disinterested observers. * * * * He has an unfeigned respect for agriculture and in fact may be said himself to have set up as a gentleman-farmer, letting out his land on shares and seldom failing to get his full half of the crop; and like the shrewed farmer he is, he insures himself against drouth and other mischances by taking his moiety early in the season.—Bradford Torrey.

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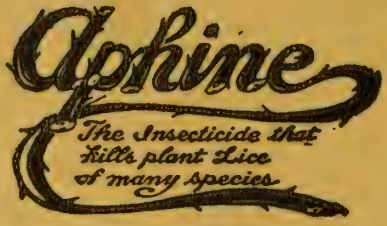

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PENTSTEMON COBAEA.

THE AMERICAN BOTANIST

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A wind that blows from out the south,
A sparrow's song, a fleeting shower,
And where but now a snowbank gleamed,
The sun lies warm upon a flower.
C. F. Saunders, Adapted.

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THE PENTSTEMONS

By Willard N. Clute

THOSE who confine their botanizing to the Atlantic Seaboard are likely to see very little of certain very attractive plants, known as pentstemons. They may, to be sure, find a small species with purplish white flowers which was formerly called *Pentstemon pubescens* but now is to be looked for under *P. hirsutus*, and they may occasionally happen upon a taller and somewhat showier species with flowers suggesting those of the foxglove and appropriately named *Pentstemon digitalis*, but to see the really showy members of the genus, one must visit the territory west of the Mississippi.

The genus seems to have its center of distribution in the Rocky Mountain region and the number of species increases as one goes westward. It is reported that there are approximately 150 species of pentstemon and in all this number very few are unworthy of a place in the garden. A number of the forms are found in Mexico, but with the exception of a single species in eastern Siberia, all are American.

Travellers in the west rarely fail to notice the brilliant scarlet species known as *Pentstemon Torreyi,* or as most seed-catalogs have it, *Pentstemon barbatus Torreyi.* It is one of the brightest and most abundant of plants in all desert-like places, especially in the Southwest. There is another form with rose-pink flowers in larger clusters found in Arizona. It does not seem to have been introduced into cultivation and its name is at present unknown to me, but if certain seedlings now in my possession mature, its identity should soon be discovered.

It would be futile to describe all the attractive species of the genus. A few bear yellow flowers but in the majority they are white, pink or blue, the blue perhaps predominating. There is an exceedingly beautiful species in parts of Colorado which has pink buds and gentian blue flowers. It is likely that this may do well in cultivation if given a well-drained soil. Most of the species are found on banks where they are able to avoid standing water, though they appear to like plenty of moisture while growing.

Among the large-flowered species are *Pentstemon grandiflorus* and *P. cobaea.* The two are very much alike but may be distinguished by the fact that in *P. grandflorus* the leaves are smooth and entire, while in *P. cobaea* they are serrate and minutely pubescent. The species of gardens is usually regarded as *P. grandiflorus* but *P. cobaea* may possibly be occasionally mistaken for it. Good specimens of *grandiflorus* may reach a height of six feet, a size not attained by *P. cobaea.* The flowers of both are two inches or more long and not a little like canterbury bells in shape. With intelligent cultivation the plants ought to be capable of much improvement. The *P. cobaea* makes a fine garden plant as it is seen from our illustration which was made from a photopraph of plants in my garden. This species

grows readily from seed and if any reader cares to experiment with it, I shall be glad to send seeds in August for price of postage.

MORE DANDELIONS

By Roger Sherman Hoar.

"Oh, yes, I wrote 'The Purple Cow'.
I'm sorry, now, I wrote it.
But I can tell you anyhow
I'll kill you if you quote it!"

WHEN my "The Quest of the Blue Dandelion" appeared in the *Atlantic* for December, 1922, I little thought what a storm of trouble it would bring down upon my innocent head .

But before coming to that point permit me to take up the tale of the quest where I left it, namely with a clump of blue dandelions blooming on the C. & N. W. right-of-way near the Bucyrus Company in South Milwaukee, and with a package of the precious seeds on the way to me by parcel post from the Reverend Father Superior at Phoebus, Virginia.

Alas, his seeds turned out to be merely chicory, which, by the way, *is* blue and *does* have dandelion-like leaves; and the railroad mowed its right-of-way, which you will remember is a habit of public service corporations where blue dandelions are concerned.

One morning, as I walked along the tracks on my way to breakfast at Bucyrus cafeteria, I found the severed blooms lying still fresh amid the dewy hay. So I gathered them and placed them in a vase in my office. I could afford, now, to use the flowers as mere decorations, for already a twenty-

foot row of seeds from these same sprouts lay securely planted in my garden.

That day I was honored by a visit from a noted engineer of Teutonic extraction. The flowers drew his attention, and he inquired what they were.

Striking an attitude, I declaimed that these were none other than the famous and fabulous blue dandelion!

He sniffed contemptously, and remarked that there was a whole field of them near his home. Now, a prominent society woman and flower-lover of Milwaukee had recently averred that she had seen what she thought was the same plant near Fox Point. So I was a bit chagrined. Then a key-hole of escape loomed before me, as I remembered that the whole field of supposed blue-dandelions in the Berkshires had turned out to be merely yellow, after all.

So I hazarded: "But yours are yellow, aren't they?"

"Oh, yes," he admitted, cheerfully enough, "but they are the same plant exactly. I can tell it by the leafs. I can tell it by the leafs."

In vain I explained to him that the whole point to blue dandelions was that they were *blue*. His card-catalog mind had indexed them by the "leafs", and for him that was all there was to it.

But as to my more recent troubles.

The general run of botanists either do not read the *Atlantic*, or have put me down as a harmless lunatic, or regard my story as an allegory. But not so *one* of their number.

This redoubtable antagonist (by profession a creator and purveyor of side-show freaks, and a botanist by avocation.) whipped his trenchant pen from its scabbard, and proceeded to demolish me in the interests of the thousands of

flower-lovers who otherwise might be "led far afield by the singularly erroneous article.."

His long and witty letter, explaining just why there can be no such thing as a blue dandelion, unfortunately did not explain much, for it consisted almost entirely of quotations from my own essay, with sarcastic comments thereon. Not then knowing his profession, I could not surmise the real reason for his spirited attack. Nevertheless one sentence of his gave me an opening. He said: "There comes to mind the indignant conclusion of the Irishman at first sight of a hippopotamus: 'There aint no such animal'."

I should have been a poor swordsman indeed (or rather, penman) to have missed such an opening, so I replied:

"Your quotation is singularly apt, for you will remember that there actually is such an animal as a hippopotamus, in spite of the Irishman's indignant conclusion. By the same token, there actually is such a flower as the blue dandelion, in spite of your indignant conclusion.

"By the way, speaking of animals, just how many quills does it take to make a porcupine? I note that you state that my article 'would pass for a porcupine if errors were quills'; and yet you cite merely two alleged errors: namely, the lily-like leaves and the biennial habit of the blue dandelion. But probably you do not intend to be taken literally, although requiring a most strict literality of me."

In his rebuttal, my enemy drew the following parallel to the editor of the *Atlantic* and himself:

"It is as if Mr. Einstein made public a mathematical assertion that two and two make five, and escaped contradiction until his feat of ledgerdemain came to the notice of Babe Ruth, who, to save the rising generation from futile perplexity, had the temerity to reprove the Euclidian protagonist."

Overlooking the fact that it would be far better to term Einstein a Euclidian *ant*agonist, still it is true that Einstein's assertion that two and two make five has thus-far escaped contradiction; and anyone who shall effectually disprove and reprove him will certainly knock a home-run in my estimation. But all this is beside the point.

The important thing about the letter was that it revealed my correspondent as the author of the famous "Jersey Devil" hoax which once had this whole continent by the ears. Daily for several weeks the newspapers from coast to coast devoted from one to three pages to weird accounts of the monstrous terror, these accounts being made up mostly from narratives of eye-witnesses. The seeming incongruity of seeing the winged monster in California and New Jersey within a period of twenty-four hours was disposed of by the late Professor Langley in a column article, in which, computing the wing-spread from the published descriptions, he showed that transcontinental flight within the stated interval was possible. Another scientific authority gave birth to the statement that the Jersey Devil furnished triumphant proof of his long-scouted contention that the so-called prehistoric-animals still existed in subterranean caverns from which they might escape through fissures caused by seismic convulsions. For several weeks the night-flying menace was seen and heard in various parts of the country by many thousands of reputable persons whose impressions were duly recorded in the newspapers, until finally the perpetrator of the hoax cashed it in by capturing and exhibiting the beast!

Now, as soon as this man revealed his identity to me by recalling the foregoing facts to my mind, I at once realized the cause of his hostility to me and to my blue dandelion: namely, that, being a professional hoaxer himself, he resented my poaching upon his preserves.

Letters from him now followed each other thick and fast. Failing to convince me that my quest had been fruitless (or rather flowerless), he turned to a well-recognized botanical authority and, misquoting my essay from memory, propounded a hypothetical question as to whether I could possibly have discovered a real blue dandelion.

Quick as a shot, his botanic majesty replied:

"I have never heard the name applied without qualification to anything except *Taraxacum*, or with qualification to anything except a plant of the Compositae family with comparatively large, yellow, dandelion-like flowers. Therefore I say unreservedly that there is no such thing as a blue dandelion."

How simple! All you have to do is to define "dandelion" as "Taraxacum or any similar *yellow* flower",and of course there can be no *blue* dandelions. Selah! Whatever that may mean.

With all due respect to my own profession, that botanist ought to be a lawyer. Or perhaps, from his readiness to condemn a fellow-man *ex parte*, he ought to be a Judge.

About this time a lady in Washington, D. C., wrote me that she thought she knew the flower I meant, only it was *pink*.

From then on there ensued a blessed respite, until the fall of 1923, when flower-lovers from all over the United States began to bombard me with requests for seeds of the blue dandelion. In this I think that I can see the fine Italian hand of my late antagonist, the vaude-villian.

Unfortunately, my twenty-foot row of blue-dandelion plants, although flourishing with a tropical luxuriance, has not produced a single seed. Nothing to blow about, as it were. And so I must deny the request of these myriad friends of my enemy.

Probably he, with his characteristic literalness, will now

protest that he is not an Italian. But, be that as it may; I am through. And, as for the blue dandelion,

"De mortuis, nil nisi bonum."

Perhaps I haven't discovered the blue dandelion, after all. But, if not, I feel very much like the little boy from the New York slums, who was out in the country for the first time, on a school picnic, and spied a blue-bird.

"Oh, see the beautiful boid," he exclaimed

His teacher corrected him, saying: "You mustn't say 'boid'. That isn't a 'boid', it's a 'bird'."

"Well," replied the little fellow sadly, "anyhow, it *looks* like a boid."

PLANT NAMES AND THEIR MEANINGS—XIX
ERICACEAE—II.

By Willard N. Clute

NEXT to the true wintergreens may come the false wintergreens of the genus *Pyrola*, though to judge from the number of vernacular names embodying the idea of evergreen foliage which they possess we might be warranted in assuming that these are the true wintergreens and the others the false. Although the plants are often called "winter green" the group, as a whole, is as often known as "shin-leaf". The name probably has nothing to do with shins, though the dictionary suggests the use of the leaves as shinplasters, but should really be "shine-leaf" from the glossy foliage of some species. In addition to "shin-leaf", *Pyrola elliptica* is known as "wild lily-of-the-valley", the white flowers faintly suggesting our familiar plant. *Pyrola secunda* is the one-sided wintergreen", and *P. asarifolia* the "liver-leaf wintergreen"

the last mentioned name referring to the three-lobed leaves of the hepatica. *Pyrola uliginosa* is the "bog wintergreen" and *P. minor*, in addition to the inevitable "shin-leaf" is "wood lily", though not at all lilylike. The term "lesser wintergreen" is probably only a book name made from the specific name.

Pyrola Americana, or *P. rotundifolia* as it was formerly called, is our best known species and naturally has the most common names. "False wintergreen", "shin-leaf", and "rough-leaved wintergreen" are most frequently heard. "Dollar leaf" refers to the rounded leaves and probably "coffee-leaf" also. The names "wild lettuce", "Indian lettuce", and"liverwort lettuce", seem to indicate the use of the plants as food though they may refer to the shape or appearnce of the leaves. "Canker lettuce" hints at medicinal properties which "consumption weed" emphasizes. The plant, however, has no value in the cure of consumption though used, like nearly every other wild plant in New England, at one time or another, as a medicine for that affliction which only rest, nourishing food and association with wild plants in the mass can alleviate or cure. This plant is known as "copalm" but for what reason is unknown. The term is often applied to the sweet gum of the Southern States and may possibly have some connection with "balm" or perhaps may be simply a mispronunciation of "copal." *Moneses uniflora*, though no longer included in the genus *Pyrola*, is still the "one- flowered pyrola." "Snow-drop," another name for the plant has no significance.

It is very probable that *Pyrola Americana* derives its reputation as a medicinal plant from being confused with the plant once known as *Pyrola umbellata* but which is more familiar to us as *Chimaphila umbellata*. This latter plant really has medicinal qualities as its name "rheumatism-weed"

and "king's cure" attest, though it is seldom that kings have rheumatism, this disease being usually reserved for their poorer subjects. The best-known common name is "pipsissewa" undoubtedly of Indian origin. The Indians are said to have called it *sip-si-sewa*. "Prince's pine" or "princess pine" indicate its use by royalty, generally. Any low evergreen plant is likely to be called a "pine" and so we have "pine tulip," "noble pine," and by an extension of the idea, "ground holly." "Bitter wintergreen" and "bittersweet" refer to the taste of the leaves and possibly "ratsbane" also though the plant is in no way harmful to rats. "Love-in-winter" is a poetic if inaccurate translation of the generic term. Our only other species of *Chimaphila* is *C. maculata* almost universally called "spotted wintergreen." It also bears the names of "rheumatism-root" and "spotted pipsissewa." The idea that the pipsissewas are harmful plants is again borne out by the names "ratbane," "wild arsenic" and "dragon's tongue" given to this species.

Many flower-gathers mentally associate other heathworts with the wintergreens, especially *Chiogenes hispidula* best known as "creeping snow-berry" or "running birch." Its foliage has the same flavor as the aromatic wintergreen and the black birch, which accounts for the last-mentioned name The plant's prostrate habit and snow-white fruits have suggested most of the other common names. It is called "mountain partridge-berry" through a confusion of the plant with the true partridge-berry (*Mitchella*). "Maidenhair-berry" is probably another popular misnomer. "Moxie-berry" and "moxie-plum" are not even mentioned in the Century Dictionary and would therefore appear to have no origin in the tongues of the Old World. We suspect them to be of Indian origin. The word *Moxa*, however, is used in medicine to indicate a plant that may be burned close to

the skin to relieve certain diseases. Our plant may have been thus used though there is no record of it. "Sugar-plum" is a fanciful name but "ivory-plum" is more descriptive and, like the same term applied to the aromatic wintergreen, may have been derived from "ivy-plum" since "ivy" is a common term to designate evergreen plants of low stature.

Among creeping plants one should not omit to mention the most famous of New England blossoms, the "May-flower" or "trailing arbutus" (*Epigaea repens*). Though not a flower of May in many parts of its range it seems fairly entitled to be considered one of *the* Mayflowers. The name trailing arbutus distinguishes it from the upright shrubby *Arbutus unedo* of the old World. "Ground laurel" associates the plant with the true laurel to which, however, it is not closely related through several other members of its family are by courtesy called "laurel", "Winter pink" is a poetic name and "shad-flower", "mountain pink" and "crocus", are clearly misnomers, or names transferred from plants better entitled to bear them. Shad-flower, however, may have as much significance when applied here, as it does when associated with species of *Amelanchier*. "Rough leaf" is a descriptive named and "ivy" is another instance of low evergreen being called "ivy." "Gravel-plant" has no reference to the soil but alludes to the medicinal virtues of the plant.

There are a number of laurels among the heathworts, but none of them properly so designated if a relationship with the classical laurel is intended. The true laurel is *Laurus nobilis* of Europe, a relative of our sassafras and spice-wood, which may be found in wooden tubs at the entrances of hotels, restaurants, and public institutions in America. Foremost among our own "laurels" is that magnificent shrub that annually glorifies the elevated regions from New Brunswick to Louisiana with a cloud of pink and white in spring.

This is *Kalmia latifolia*, the "mountain laurel" or "American laurel" which the prosaic New Englanders "damn with faint praise" by calling "calico-bush." It is occasionally called "small laurel" and "wood laurel" and in the southern part of its range is known as "ivy," "big-leaved ivy," "ivy-bush" or even "poison ivy." The name of "spoonwood" is said to have been given this plant because the wood was once used in making spoons, but it is doubtful if it was ever used in this way. "Clamoun" is a name difficult to understand. Perhaps it is an attempt of the unlettered to pronounce *Kalmia;* if not, our only recourse is to suggest that it is an Indian name!

Kalmia angustifolia, second only to *latifolia* in beauty, is disparaged by such names as "lambkill," "sheep poison," "calf kill," "kill kid" and "sheep laurel." All these allude to the poisonous foliage. "Dwarf laurel" refers to its height and "spoonwood ivy" to the reputed use of the wood. "Wicky" is probably an Indian name. *Kalmia polifolia* is the "pale laurel," or "swamp laurel," both names descriptive of the plant.

The great laurel belongs to a genus allied to *Kalmia* and is named *Rhododendron maximum.* It is also known as "big laurel," "big-leaf laurel," "deer-laurel" and "horse laurel." "Horse laurel" refers to its size in comparison with *Kalmia* but "deer laurel" appears to get its name from the fact that it grows where deer are found. After laurel, the name most commonly used for our plant is "rose bay," though the real rose bay is the oleander. Other names for plant are "bee laurel," of no significance, "cow-plant," perhaps akin to the term "sheep laurel" applied to *Kalmia,* "mountain laurel" by general consent a misnomer, and "spoon hutch" another allusion to the use of the wood in making spoons. Since the stems of all the laurels are scarcely of a diameter of a spoon it is a puzzle how any of them came to be

alled "spoonwood." *Rhododendron catawbiense* is the mountain rose-bay" and *R. Lapponicum* is the "Lapland ose-bay." Both species are also called "laurel."

Some slight differences in the flowers have given systemtists a chance to separate several deciduous species of *Rhodendron* into the genus *Azalea*. Chief of these is the Mayflower" or "wild honeysuckle" (*Azalea nudiflora*). It s one of the few species that when in bloom dominate the ndscape. It is not closely related to the true honeysuckles, ut its strong and pleasing fragrance causes it to share the ommon name. Among names derived from its color are pink azalea," "swamp pink," "river pink, and "purple azaea." From the fact that it blooms at Whitsuntide it is nown as "pinkster" and "pinkster-flower," the Dutch name or the season being Pinxter. Though all the species are alled "azalea" this is the one usually so named without qualiying adjectives. The plant is also called "swamp honeyuckle"and "election pink," the latter name merely a fanciful ppellation of no significance. *Azalea viscosa* is the "white swamp honeysuckle" from its color and place of growth, and clammy azalea" for its sticky foliage. An arborescent pecies, *A. arborescens,* is known as "smooth azalea" and tree azalia". *Azalea lutea,* often known as *A. calendulacea,* a species abundant in the southern Alleghanies, has larger showy red or yellow flowers and is known as "flame-colored azalea," "flaming pinkster," fiery azalea" and "yellow honeysuckle." The alpine azalea" is *Loisleura procumbens.* Its only other vernacular name appears to be "trailing azalea." A famous New England plant, immortalized by Emerson, is the "rhodora" called variously *Rhododendron Canadense, R. Rhodora* and *Rhodora Canadense.* Through it it all, the vernacular name has continued unchanged, an example of

stability that the technical name cannot approach though scientists have tinkered with it on many occasions.

Leiophyllum buxifolium is still another myrtle, this time "sand myrtle". Another name, "sleek leaf", is merely a translation of the generic name and is probably not in vernacular use. Included in this group of low or creeping plants may be the "mountain heath" whose technical name is *Phyllodoce coerulea.* Another "mountain heath" is *Menziesia glabella.* A second species, *M. pilosa,* is the "minnie-bush" which name is regarded as the equivalent of Menzies' bush. From the fact that the specific name of our only species of *Cassiope* is *hypnoides,* we derive the vernacular names or more probably the book names of "moss-bush" and "moss-plant," though the short stems and tiny leaves make the plant rather mosslike.

According to the generic name, *Chamaedaphne,* the plant bearing it should be a low one, but our only species, the familiar "leatherleaf" (*C. calyculata*) grows to a height of four feet or more. The vernacular name refers to the small leaves which at the approach of cold weather don the colors of russet leather and remain on the plant until spring like a new sort of evergreen. The plant is very often known as "cassandra" since this was the generic name until very recently. Another remarkable plant inhabiting localities similar to those preferred by the leather-leaf is the "Labrador tea" (*Ledum Groenlandicum*). Its evergreen, revolute leaves, covered with wool on the under sides, is often used for tea, hence the name. Still another heathwort that loves cold bogs is the "marsh rosemary" (*Andromeda polifolia*). This is also known as "bog rosemary", "wild rosemary", "moorwort", and "marsh holywort". The last mentioned name, as well as "rosemary", was undoubtedly given to the plant from some fancied connection with the Virgin, but rosemary in this case

means simply "dew of the sea". Our plant in the old days was known as *rosmarinus, sylvestre minus*. A larger species of *Andromeda* is named *floribunda*. This is the "mountain fetter-bush". If we are to believe the books this vernacular name is due to the fact that the twigs form such dense clumps that animals have difficulty in pushing through them,—an idea that the appearance of the shrub does not bear out. Still another "fetter-bush" is *Lyonia nitida*, until recently classed with the *Andromedas*. This is also called "pipe-stem" probably from its hollow stems. A southern species is known as "pipe-wood" because its hollow stems are used by smokers. *Lyonia Mariana*' is familiarly and appropriately known as "stagger-bush". Like so many other members of the Ericaceae, its foliage is poisonous to stock and it has even been accused, doubtless without reason, of producing poisonous honey. It may be possible that "fetter-bush" applied to allied species may after all refer to the poisonous nature of the plant and its tendency to hinder the locomotion of animals that eat it. "Wicks" may be another form of "wicopy" used for other members of this family. "Sorrel-tree", which Britton lists among the names of this plant is clearly a misnomer and probably is an error made in transcribing the names. I am at a loss to know why *Lyonia ligustrina* should be called "male-berry". Among its other names is "seedy buck-berry" "white wood", "white alder" and "pepper-bush". The last mentioned name is probably derived from the small round seed capsules but the others are meaningless for the plant has little resemblance to the alder. The plant commonly regarded as best entitled to the name "white alder" is *Clethra alnifolia*. The generic name of this plant is said to have been the ancient Greek name for the alder and the common names have followed the scientific for some thousands of years. Besides "white alder", this plant is known as "white

bush", and "spiked alder", in reference to the color of its flowers, and "sweet pepper-bush" from its fragrance.

The plant most frequently called "fetter-bush" is probably *Leucothoe Catesbaei*. This is also the "dog-hobble", the name given for the same reason that "fetter-bush" is. It has poisonous properties and from this circumstance it is known as "poison hemlock," though the plant is most distantly related to the true hemlock. "Dog laurel" refers to this idea that small animals have difficulty in making a way through thickets of this plant. *Leucothe racemosa* is another "pepper-bush" and also "white osier". The only real tree among the American heathworts is the "sour-wood" (*Oxydendrum arboreum*). The vernacular name, however, is inexact for it is the leaves and not the wood that is sour. "Sorrel tree" is not inappropriate but "elk-tree" is still a puzzle.

There remains to be noted, four members of the Ericaceae that are so unlike others as scarcely to warrant inclusion with them. These last species are parasitic or saprophytic plants, lacking green color in all of their parts and so fungus-like in their growth and nutrition that the unbotanical are wont to regard them as true fungi. The most familiar is the "Indian pipe" or "corpse plant (*Monotropa uniflora*), which springs up suddenly in shaded woodlands after a summer rain. The urn-shaped single flowers on scaly stems bend toward the earth in exact similitude to a small white pipe. The derivation of such names as "pipe plant," "Dutchman's pipe", and "fairy smoke is apparent. "Ghost flower" and "corpse plant", of course refers to the pure white flowers and "bird's nest" may refer to its tangle of fibrous roots, but this is not certain. The plant has some reputation as a medicinal herb—which it does not deserve—and has been called "convulsion weed", fit-root plant", and "eye-bright". The name of "American ice plant" alludes to the translucent white-

ness of the stems but the book-makers, ever ready with an explanation, say of it "The whole plant is so tender and succulent that if handled and rubbed a little it will melt and soften almost like ice". A related plant, *Monotropa hypopitys*, has several flowers on a stem and is usually tawny or reddish in color. It is usually called "pine sap" from the idea that it grows on the roots of coniferous trees, a fact to which the specific name, meaning "under fir trees", alludes. This is the "yellow bird's-nest" and "false beech-drops" the true beech-drops being regarded as a colorless plant (*Epiphagus*) of the Broomrape family. "Fir rape", corrupted to fir rope, has a significance similar to broom-rape. *Monotropsis odorata* is the "sweet pine-sap" because of its odor. It is also known as "Carolina beech-drops" from its habitat. The "giant bird's nest" is *Pterospora andromeda* more commonly called "pine drops" and "Albany beech-drops". In the last name, Albany refers to the place where the plants were once found and is scarcely descriptive since the plant has a much wider range.

CONSPICUOUS TROPICAL PLANTS

(Continued.)

A CHARACTERISTIC plant in Honolulu, especially about the houses of the natives, is the papaya (*Carica Papaya*). An erect trunk generally but not always unbranched, bearing at the summit a crown of large palmately lobed or divided leaves, 15 to 20 inches in diameter on petioles two feet long. In the axil of each in the female plant is a bud, blossom or fruit. There will thus be always fruit in all stages of growth, the lowest quite ripe and yellow, the rest green. The fruit is melon like in size and structure, obovoid and four or five inches in diameter, but the seeds are surrounded with a fleshy covering. A plant will ripen several of these fruits each week for several years. The male tree produces great spreading panicles of waxy white blossoms having a delicious spicy fragrance.

Another tree which during the summer months will attract attention by a tempting display of fruit is the avocado (Spanish for advocate or lawyer), more commonly known as the alligator pear (*Persea gratissima*). The tree is not usually very large nor is its foliage particularly attractive —rather coarse, somewhat rough obovate leaves six or eight inches long. The fruit is commonly of an elongated pear sharp, sometimes club-shaped, occasionally curved like a crook-necked squash, but also sometimes quite spherical; smooth-skinned until quite mature, green, then in some varieties changing suddenly to a dark purple like that of the egg-plant fruit, in others becoming merely somewhat yellowish. The weight might range from 8 to 25 or 50 ounces ac-

cording to the variety, or rather according to the individual tree, for each seems to be a law unto itself. The fruit contains a single very large seed of the shape and size of a boy's peg top; this is surrounded with a pulp of delicate texture which almost melts in one's mouth—not sweet or acid, but having a characteristic nutty flavor that commends it highly to the educated palate. It is commonly eaten with salt and pepper, with or without vinegar, often with a mayonaise dressing, or in a sandwich with thin bread and butter; frequently as an addition to bullion or consomme soups.

The custard apple (Cherimoyer) is not much planted in Honolulu, although the fruit sometimes comes into market from other districts. The sour sop, a congener, you will meet with more frequently, the tree with foliage somewhat like that of the avocado, the large fruit, remaining green when mature, covered with prickle-like scales. As in other custard apples, the pulp contains scattered through it, numerous brown seeds. It is fibrous and quite acid, resembling cotton batting soaked with a solution of cream of tartar. Few persons profess a fondness for it.

Over arbors you will often see trained a vine of luxuriant growth, with ample, nearly round leaves and fragrant dark purple flowers four inches or more in diameter, whose multitudinous rays proclaim it a passion flower. Among the leaves you will see here and there the large melon-like fruits, oval, pale green, with a smooth skin, six or eight inches long. This is the granadilla, one of the most delicious of tropical fruits. The edible part is precisely that which is rejected in the melon or papaya. Each seed is enveloped in a pulp which is agreeably acid and of a characteristic pleasant flavor. Only those with antiquated ideas about the cause of appendicitis hesitate about partaking of the delicacy, for to remove the seeds from the pulp would be a profanation.

Another passion flower produces a dull purple fruit of the size of a goose egg, which has a similar acid pulp, less delicate in flavor but prized by many; it is known as the water lemon. Still another species, distinguished as the sweet water lemon, has a fruit somewhat larger and of a rich yellow color when ripe, the pulp, however, wanting in acidity and so not highly esteemed.

Other fruits that will be found in Honolulu are the South American mammee apple, a fine tree with handsome foliage; the pomegranate, planted as an ornamental shrub rather than for the sake of the fruit; the pine apple in numerous varieties, the loquat, the Java plum and so-called Spanish cherry (both Myrtaceous), and the familiar peach. Very few of the fruits of the temperate zone will grow in Honolulu. Apples, pears, plums, cherries, as well as such berries as the raspberry, blackberry, currant, gooseberry, and huckleberry are conspicuous by their absence—strawberries, however, may be had any month in the year, and may be said to be in season nine months out of the twelve.

One of the finest exotic shade trees is the samang, commonly known in Honolulu as the monkey-pod tree. It is one of the numerous leguminous trees that have been introduced, most of them belonging to the acacia or to the cassia group, and having accordingly compound or decompound leaves. This is a great spreading tree of rapid growth, throwing out branches as near the ground as circumstances will permit. Like many other plants of the family, it has the habit of folding together its leaflets at night, so that after six o'clock it presents a peculiar wilted appearance, quite in contrast with its ordinary aspect, which is one of exuberant vitality. The foliage may become a little ragged in winter, but only preparatory to a more glorious rehabilitation, which culminates with its blossoming time, when for weeks the

deep rich green of its foliage is seen through a haze or mist of rose-purple. The blossoms, like those of other acacias, are tassels consisting mostly of the conspicuous filaments. A tree twenty years old may have a bole twelve of fifteen feet in girth and cover with its shade a circle a hundred feet in diameter.

What the elm is to us in the northern states, the algaroba (Keawe) is to the kamaaina in Honolulu. Its lank, lawless, often contorted branches are too conspicuous, but they have a picturesqueness of their own, and if we have been inclined to take offense at these on artistic consideration, there is a grace in the poise of its slender branchlets and a witchery in their swaying to the breeze, and a childlike lightheartedness and abandon with which the tree gives itself to play with sunlight and shower, with gale and zephyr that make irresistible appeal to that in the human life that reflects the life universal.

Not on sentimental grounds, only, is the algaroba a favorite. It is a tree easily propagated and of rapid growth. Its diaphanous shade moderates the heat of the tropical sun, yet permits the grass beneath it to grow perfectly well; in dry seasons, indeed, saves it from scorching. It supplies fuel for the kitchen, fodder, in its saccharine pods, for the horses, and honey of finest quality for the bee hive. Finally its roots go so deep that they find water for vigorous growth where other trees can be kept alive only by irrigation. The arid lowlands on the lee coasts of Oahu and other islands have been converted from desert to forest by the algaroba tree. And the parent tree from which these forests have sprung still stands, not yet an old tree, near the Roman Catholic Cathedral on Fort street.

(*to be concluded.*)

PRACTICAL PLANT PROTECTION

By Willard N. Clute

AN immense amount of sentiment is being wasted on the protection of our native wildflowers. In some communities the movement has almost reached the point where the picking of a blossom from an uncultivated area is regarded as an act of vandalism. If it were true that the gathering of wildflowers, or even their destruction, is a misdemeanor, the farmer and the gardener, not to speak of the faithful horse and the placid cow, would be classed among the greatest criminals. What hosts of goldenrod, bouncing bet, toadflax, daisy and buttercup they have all destroyed! It depends a good deal upon the species uprooted. If any farmer, single-handed, could exterminate every plant of quack-grass, pigweed, burdock, wild lettuce and Canada thistle in the world, instead of being ashamed of the deed he would glory in it and be acclaimed a hero by the legions of hard-pressed agriculturists battling with the weeds.

Clearly it is out of the question to expect to protect all the plants with showy blossoms. Several of those already named are not only in no need of protection but actually survive, flourish and extend their holdings in the face of the most determined opposition. There are a large number of others that are well protected by their position on high mountains, in the midst of deserts, on inaccessible cliffs and the like. No band of marauders, out for a day's picknicking, will exterminate whole colonies in such places, but the common plants of our more settled communities certainly do need

protection and the question now uppermost is how to go about protecting them.

The sentimentalist, taking a leaf from the bird-lover's note-book, would protect the plants with general laws like those which have been so successful in protecting the birds. In this he has overlooked the fact that the birds can always move out of harm's way if given a chance and thus may well be regarded as the property of the public, but the wildflowers being rooted in the soil, survive only so long as the particular area they inhabit is not wanted for something else.

There is no reason, however, why the showy flowers should not be protected in areas not under cultivation. At present in many parts of our country, about the only recourse of the land owner interested in preserving his plants is to bring suit for trespass with strong prospects of being unable to prove material damage and the consequent loss of his suit. Laws which place the taking of flowering plants from lands properly posted in the same category as the theft of any other material would do much to prevent the inroads which all wooded areas and other unused lands must sustain annually. As to the plants in lands uncared for by their owners, who can make laws for them? Laws of this nature usually stop at the property lines. If the owner chooses he may collect and sell the plants, allow others to do so, or even uproot them entirely.

Fortunately for the wildflowers as well as for ourselves, only a comparatively small number are so situated that they cannot maintain their numbers under moderate gathering. Among this number however, are several of our showiest species including the cardinal flower, the fringed gentian, spring beauty, Dutchman's breeches and many phloxes. These are so lightly fixed in the soil that there is always danger in

uprooting them. Another group, which includes the trilliums, the mandrake, Indian turnip, and numerous orchids and lilies, consists of plants whose leaves are almost invariably gathered with the flowers. Since the leaves of one year form the material from which next year's blossoms come, to collect the leaves with the flowers is about as certain to exterminate them as is rooting them up.

Slow growing species like the arbutus flowering dogwood and laurel are other plants that cannot stand an annual shearing. Other plants, in which the leaves rather than the flowers is the chief attraction are especially in danger since they may be in demand at all seasons and not merely when in blossom. This is particularly true of the evergreen species. The demand for Christmas greens has practically eradicated the ground pine from large areas while the laurel, galax, holly and smilax are being rapidly reduced in numbers by the same demand. The small Christmas tree has now almost reached the dignity of a farm crop, since certain areas are being set aside for its production and there seems to be no good reason why others in its class should not be cultivated.

One of the greatest obstacles to the working up of a proper sentiment for plant protection is the idea held by the great majority that flowers are in some way a product of the earth, growing from it somewhat like wool grows on a sheep. They fail to see the harm of the annual gathering, assuming that a new crop will appear with the new year. That plants get their food from the soil is a time-honored but entirely misleading statement. The bulk of the plant really comes from the air and is made into food in the leaves. To remove the leaves, therefore, is to reduce next season's crop. Were this thoroughly understood, there would likely be less flower-gathering by everybody.

The early spring flowers, regardless of their claims to beauty, are probably more in danger of extermination than any others. These firstlings of the year are more than mere flowers—they are the harbingers of spring; the guaranties of a milder season. As such they attract even those prosaic human beings who at other seasons pass the flowers by without a glance, reading their morning paper, perhaps, on a train flying across a country of greening fields and budding woodlands spangled with flowers.

While mentioning the flowers in need of protection, it may be well to point out some of that larger number which neither ask nor need protection and which may be gathered in quantity when one is so minded. We may begin with those which the farmer regards as weeds, such as toad-flax and daisy and include the golden-rods, asters, sunflowers, buttercups and brow-eyed Susans. Then there are others so rampant of growth than an annual pruning seems fairly beneficial, among which are the elder, the wild crab, the steeple-bush, and the Joe-Pye-weed. Last of all is the violet, particularly the flower of childhood, endowed by nature with two sets of flowers, one, bright-colored, attractive, and borne only to be gathered by little hands; the other inconspicuous, seeding abundantly and spreading the race, entirely oblivious to any efforts of protection made in their behalf.

NOTE *and* COMMENT

Plants Used in Medicine.—Vendors of patent medicines are fond of emphazing the fact that their nostrums contain only vegetable ingredients, but the stock in trade of the regular physician does not differ much in this respect. Nor are most of the plants used in medicine imported from remote parts of the world. Probably the majority of them are dug up in our own woods and fields. Since there are a number of showy wildflowers in the list, a new aspect is put on the protection of our native flora. We may yet have to decide whether to "leave the dainty recluse to fulfill the law of its being", or to tear it ruthlessly from the earth to assuage our aches and pains. At the present time efforts are being made to grow several of the wildflowers in commercial quantities but thus far with only partial success. It is the same with many drug plants. We no longer hear of the vast sums to be made from a garden of ginseng. Doubtless the ginseng-promoters are now selling oil-stock, or indulging in other get-rich-quick schemes. Contrary to general opinion, there in very little money in collecting drugs. The price for most plants, dried, is under fifty cents a pound and this does not pay for the time and labor expended in digging, cleaning and marketing. In this magazine for 1919 we have listed both the official and officinal drug plants of North America, but it may be well to mention here the species with showy flowers used in medicine, that are often regarded as wildflowers to be protected. The list includes devil's-bit, colic-root, red trillium, blue flag, all the lady's-

slippers, Canada ginger, serpetaria, bug-bane, hydrastis, goldthread, pasque-flower, mandrake, blue cohosh, bloodroot, squirrel-corn, sundew, wild indigo, cranesbill, Seneca snakeroot, mallow, passion-flower, rock-rose, spikenard, angelica, bearberry, yellow gentian, buckbean, butterfly weed, bittersweet, vervain, elder, Indian tobacco, grindelia, dandelion, colt's-foot, purple cone-flower, boneset and squaw-weed. All the foregoing are standard drugs. There is another list of plants that on occasion may be substituted for them among which we find sweet flag, Indian turnip, skunk-cabbage, water lily, hepatica, moonseed, celandine, agrimony, Jersey-tea, ginseng, trailing arbutus, milkweed, Collinsonia, motherwort, pennyroyal, partridge berry, Joe-Pye-weed, rosinweed, ragweed and yarrow. Clearly the protection of plants is rather more complicated than the mere securing of laws prohibiting the picking of wildflowers.

No Crop Failure in 4000 Years.—The arguments in favor of diversified farming as against a single crop system would vanish if there were any way to prevent that single crop from failing. No way to do this has been found, yet it is remarkable that lower Mesopotamia has operated practically on the single crop system for at least 4000 years, and probably for centuries longer, without the record of one crop failure. Mesopotamia's crop is dates which not only forms the staple food of the people but is that country's chief export. Since early biblical days the date palm has been carefully cultivated there and writings on the subject that have been carefully preserved on brick tablets prove how much scientific knowledgs the date growers of those early times had gained. It was to water these date palms, that the first irrigation system known to man was devised.—*National Nurseryman.*

JOHNNY APPLESEED.—The note regarding "Johnny Appleseed" in the January number of this magazine has brought out several addional bits of information. Mr. S. H. Burham writes that the Macmillan Campany has issued two printings of a novel by the Rev. Newell Dwight Hillis under the tittle of "The Quest of John Chapman; the story of a forgotten hero." According to Mr. Burnham, Harpers have also issued (1915) "Johnny Appleseed, the romance of the Sower," by Mrs. Eleanor (Stackhouse) Atkinson. Rev. C. W. G. Eifrig, commenting on the statement that Chapman's burial place is unknown writes: This is an error. Last year I had the privilege of standing at the grave of "Appleseed." This was in connection with the annual pilgrimage of the Society of Indiana Pioneers and the Indiana Historical Society to Ft. Wayne, Indiana. After all the historical spots in and around Ft. Wayne had been visited, including the sites of the various French, English and American forts, the pilgrimage wound up at the grave of Johnny Appleseed. This is on the Rudisill farm about five miles north of the city. The grave is in the middle of a small cemetary, used only for a short time by the neigborhood. Chapman had died nearby at the farm home of William Worth. The grave has been supplied with a strong iron fence and a monument by the Indiana Horticultural Society, if I remember right. The inscription on the stone: "John Chapman 'Johnny Appleseed' died in 1843". (not 1847 as stated in the note in question). There is also a tablet erected to his memory in Swinney Park in Ft. Wayne. There are still apple-trees in and around the city, patriarchs of their kind, that are pointed out as having been planted by Johnny Appleseed. Appleseed was a unique character in the pioneer stage of that part of our country. It is said that in order to reduce the number of bundles containg his few belong-

ings, he carried a cooking pot or a frying pan, or both, on his head instead of a hat. No wonder the Indians held him in awe! He was an adherent and student of Swedenborg.

London Pride.—Several readers have kindly supplied the scientific name for the plant known as London pride, mentioned in the January issue. Although sweet William and bouncing Bet occasionally bear this name, the plant designated by our correspondent proves to be *Lychnis chalcedonica*. This, Miss Julia J. Noll notes, is more frequently called scarlet lightning or Jersualem cross. Mr. A. L. Truax writes: "This plant is more commonly called London pride than any other plant I know of and it also answers to the description—somewhat like a tall phlox with scarlet flowers and notched petals." Dreer of Philadelphia applies the name London pride to *Saxifraga umbrosa*. [So does Bailey's New Manual—*Ed*]. The common sweet William is sometimes called London tuft but I have never heard it called London pride. All of which is further illustration of the uncertainty and futility of the use of common names". Mr. Howard Whitney remarks that *Lychnis chalcedonica* is perhaps the best known of its tribe and that Henderson says it is valuable because there are so few flowers of that color among our hardy herbaceous plants. There is a fine double variety also a double and single white as well as a rosy pink. Concerning the common names he says: "I believe that every plant has an entity and that this entity is represented by its name. While it is true that some plants are known by different names in different parts of the country, and some names represent different plants in different parts of the country, still after rejecting names given from whims and caprice and for mere convenience, there remain the suitable names, some of which go back into the past so far that their origin is not known. These represent the plants' true names.

They could just as well be scientific as the technical names but people have not come to a sufficiently intelligent state to have plants classified that way. Red maple and red oak are just as true names as *Acer rubrum* and *Quercus rubra*. Latin is a foreign language and the only reason for retaining these names is that scientific persons throughout the world may have a language understood by all. Common names are part of one's own language and should be used intelligently with the hope that some day they may become so exact and representative that a foreign terminology may be dispensed with. As to the identity of the cup-and-saucer plant also asked for, several have suggested it might be a bellwort, *Campanula calycantha,* but the suggestion of Miss Julia J. Noll and Miss Adella Prescott that it is probably the primrose called polyanthus is likely to prove the correct one. One of the pleasant features of conducting the magazine, is found in the ready response its readers make to appeals for help in solving botanical puzzles. It is to be feared that Mr. Whitney does not look far enough into the suggested application of the common names. It would probably work when a plant collector was speaking to another in the same State, but how would we make the Germans, French, British, Russians and Japanese use our common names? Many of our common plants grow in the countries of the Old World and their common names should have precedence on the "saw-it-first" principle. Certainly we could not expect them to let us make the common names for them! Clearly technical names, written in a language that does not change, is best when we require accuracy.

Largest Vines.—In the November *Botanist* the editor observes that "which vine is the largest will have to be left to somebody more familiar with tropical botany than the writer". From my acquaintance with tropical vines it

seems to me that with but few exceptions their outstanding features is not size but floriferousness. The largest vines I have ever seen were scuppernong grape vines and I remember reading once that the largest vine in the world was an very ancient grape-vine in England. Wild grapes grow very abundantly in Florida the vines sometimes covering lofty trees or covering small trees and shrubs so as to form impenetrable thickets. In a story printed some time ago in a boy's magazine the hero was lost in a Florida swamp and in the course of his wanderings became entangled in "the sea-grape-vine". This was amusing to those who know the sea grape for it is not a vine at all nor even a grape but a beautiful small maritime tree (*Coccolobus uvifera*). The fruit hangs in clusters, hence the common name.—*Mrs. W. D. Diddell.*

Oil-glands of the Lemon.—It is well known that the leaves of the lemon tree (*Citrus limonium*) are fragrant though much less so than its flowers. To discover the seat of the fragrance, a small piece of the upper epidermis was put on a slide and carefully measured. It presented a surface of 100 square millimeters. It was then transferred to a microscope which revealed, as was expected, many oil dots. On account of their abundance it was thought of interest to know the number present in an entire leaf and they were counted with great care. In this small piece there were found 150 dots. In another piece from another leaf 110 dots were counted in an area of 70 square millimeters. In the entire leaf with a surface of 2570 square millimeters, there were, if evenly distributed in it as they seemed to be, 4040 oil dots. —*Edo Claassen, Cleveland, Ohio.* [In Mr. Claassen's note on the number of stomata in a leaf of *Urginea maritima*, a piece of leaf 16 square miilimeters in size was set down as 16 millimeters square—a very different proposition. Fortunately

the computation of the number of stomata in a leaf was not affected by the mistake.—Ed.].

Phlox argillacea in the Garden.—Regarding that interesting plant of the Middle West, known as the silvery lavender phlox (*P. argillacea*) a correspondent writes: "My specimen has thived immensely in a light soil with sand sub-soil, forming a handsome clump of some 30 or 40 stems. A pleasing characteristic is the persistence of its leaves in autumn and the delightful yellow they take on. This clump was the last spot of color in the garden long after our domesticated phloxes and the peonies are dead and black."

Birds and Bittersweet Berries.—A correspondent asks information regarding the belief that when young birds are caged, their parents will feed them bittersweet berries or other berries to kill them. This may be a very ancient and common superstitition but the writer of these lines has never before heard of it and will welcome more data regarding it. No doubt the parents of caged birds will visit them if possible and perhaps carry them food, but it would be going too far to credit them with sufficient intelligence to understand the meaning of captivity and the resolution to cause the death of their offspring rather them to leave them to endure it. This superstition is akin to another which has come down to us from hoary antiquity regarding the blasting root or spring-wurzel. It appears to have even antedated Aristotle, the so-called "father of natural history". Various plants, conspicuous among which are the mandrake (*Mandragora*) the herb Paris (*Paris quadrifolia*) and certain fern roots, were credited with magic powers. To obtain the charm, however, there was one standard way. One should find the nest of a woodpecker, swallow, or other bird nesting in holes and carefully stop up the entrance. As soon as the mother bird finds herself barred from her young, she

flies away and soon brings back a plant which laid at the entrance will at once remove the obstruction, no matter how strongly fastened. One then has only to frighten the bird away to secure the coveted prize. If this is merely laid in the keyhole, it will open any lock. There is also the celandine or swallow-wort (*Chelidonium majus*) with which the swallow restores the sight of any nestling which happens to be blinded. In early days more than one poor bird was blinded by ignorant yokels intent on securing the "kenning-wort" by which even man himself was to improve his sight. Such superstitions have remarkable vitality. Country boys still split the tongues of crows in the hope of enabling them to talk and doubtless have not entirely ceased to look for the jewel in the toad's head.

Abundance of Erysiphe.—On the lower surface of a leaf of Jerusalem artichoke (*Helianthus tuberosus*) with a surface of approximately 24,000 square millimeters, half of which was covered by the mildew, *Erysiphe cichoraceurum*, there was found an average of 50 perithecia (fruit bodies) to each 40 square millimeters, or a total for the leaf of 15,000. The upper surface of the leaf, though covered by a thicker mycelium, seemed to possess a similar number of perithecia. As each perithecium usually contains four or five asci each (but often more) with two spores in each ascus, it is not astonishing at the proper time, to find this mildew on many species of Compositae, which order of plants it seems to prefer to live on. A mildew hunter can hardly cross a field without noticing it.—*Edo Claassen, Cleveland, Ohio.*

Tamarix articulata.—Apropos of *Tamarix* discussed in the last *Botanist* they are growing a tree now in some parts of the Colorado desert of California which I have seen thirty feet high or more. It is locally called Athol.—*C. F. Saunders.* [The different forms of *Tamarix* seem specially suited

to desert conditions. One sees them used for shade and hedges in the driest regions, and everywhere they retain their green and thrifty appearance in marked contrast to the other desert things that are so uniformly gray-green.—*Ed.*]

Star-grass in the Rockery.—The little woodland yellow star grass (*Hypoxis erecta* or *hirsustus*) adapts itself to the Rock Garden even where it gets full sunshine. A clump of it planted beside a friendly rock where its bulbous roots can be assured of at least a little moisture it will bloom continuously from May to October. Every day a fresh crop of golden stars open from numerous green buds to replace those that have shrivalled on their tiny stalks. When one scape or stalk has exhausted all blooms another is growing alongside to take its place. Seeds are produced freely which help to enlarge the colony. The hairy grass like leaves turn bronzy in fall and finally disappear for the winter. Without the slightest protection these humble plants have come through three winters and four hot summers and appear to have increased in size and vigor. At no time does the Yellow Star Grass make a great display but as a constant bloomer it has few rivals among the humbler plants.—*R. M. Crocket.*

Tahiti Lycopodiums.—One of the most pleasing discoveries I made in the island of Tahati was a Lycopodium or Selaginella with flat, rather delicate sprays which produces fruiting cones at the tips of the branches somewhat ilke *Lycopodium Selago.* It has often been regarded as a fern, but the resemblance to the tree-like ground-pine (*L. obscurum* or *dendroideum*), of New England and elsewhere, was so striking that it could not be mistaken. The fronds were very dark green and they favored steep, moist, shady banks and the sides of caves or hollows in the rock, dripping with moisture. The first place I found it was among the steep-

est gorges of the Fautua, with the famous fall not far distant; and I was subsequently as much surprised as I was delighted to run across the same beautiful lace of Nature sparingly along the wet, shady bluffs of the northeasterly coast. As in *L. obscurum*, some of the fronds are more wiry, brighter green and less lacy. The Lycopodium of dry ground (*L. cernuum*), is not so common in Tahati as in the Marquesas, where it grows to small tree height on the plateaus, forming thickets like grasses or cat-tail.—*J. O. Staneliff.*

Flowers of Willow-herb.—The purplish flower-buds of the willow-herb (*Epilobium angustifolium*) have a fashion of drooping at the tip of the stalk and gradually lifting themselves up as they grow toward flowerhood. One of the striking features of the purple flower is its long-exserted pistil. When the stamens are ripe the pistil is like a purple bud on a white stem. As it lengthens the tip separates into four sections that curl back and are white on top. The slender pods when ripe divide into four parts that curl back just like the stigma, revealing and releasing the small brown seeds, each with a parachute to carry it away. From the bud to the ripe pod there is always a white streak on the side of the pod next to the ground.—*Nell McMurray.*

EDITORIAL

In this issue former Senator Hoar observes that he is through with blue dandelions, but we are inclined to doubt it. He may be quite willing to let the matter rest, but he does not know the temper of the botanist in quest of a new variety. After arousing the curiosity of all who read those two great magazines the *Atlantic Monthly* and the *American Botanist*, he should know that nothing will satisfy them but a real living blue dandelion and none of your dyed specimens, such as we are wont to solace the Irish with on St. Patrick's day, will suffice. Blue dandelions and blue moons seem to be about equally rare, but since the old saying "Once in a blue moon" apparently admits of the possibility of there really being a blue moon, we infer that once in a blue moon there may be a blue dandelion! It is well known that the dandelion is the most highly specialized of dicots. Perhaps it has arrived at a stage in its evolution when, like the chameleon, it can change color. Surely the highest of plants ought not to be excelled in chromatic aberrations by a mere reptile. Personally, therefore, we shall continue to hold that there are blue dandelions, and though we do not believe in them and never expect to see one, shall still say with the poet

"And then its hue!
Whoever saw so fine a blue!"

* * *

Old readers of this magazine know that we have three different subscription lists, but they probably do not know that only one of them is in a growing condition. The Patrons

list is dormant because it was closed some years ago, but since then we have lost only two names from it! The Annual list would be steadily increarsing but for the fact that it so consantly loses to the Permanent list through new subscribers transferring to it. There are a number of advantages to be gained by becoming a "permanent" subscriber, and we suggest to all who think of taking the magazine for more than a year, that they investigate the possibilities of the list. We welcome all annual subscribers but we are also glad when they become permanent supporters of the magazine.

BOOKS AND WRITERS

The folks in North North Carolina are now forbidden to think about evolution. * * * The Governor says he does not believe that man descended from a monkey. * * * Neither do the evolutionists but certain southern thought-throttlers have not discovered it yet. * * * Well, the Governor of North Carolina will still have a subject for conversation with the governor of South Carolina though it may now savor more of Darwin than of Volstead. * * * Charles W. Bowles of Menlo Park, Calif. has issued an interesting "Outline of the Animal Kingdom" uniform with his outline of the plant kingdom published in this magazine for 1919. * * * "The tree that owns itself" has now another distinction. * * * It has called in a tree surgeon to repair its broken limbs. * * * This magazine published an account of the tree with photograph in 1918. * * * They are planning a national Arboretum in Washington. * * * Looks like a good move. * * * It may be observed in passing that what appears to the largest Arboretum in the country is located in Joliet. * * * More than 600 acres with all the native trees and most of

the hardy exotics. * * * The author of "Wildflowers of the North American Mountains" writes from Switzerland to say that the report of her book being out of print is incorrect. * * * The book has changed its title, and also its publisher, but it is still the same old book. * * * C. F. Saunders is revising his "Finding the Worth-while in the Southwest" in anticipation of a new edition. * * * This reminds us that the second edition of Smalls "Flora of the Southeastern States" is about out of print. * * * Funny how some people wait till a book is sold out and then pay advanced prices for second-hand copies. * * * "The Glorious Gladiolus", reprinted from the *Gladiolus Bulletin*, tells all abut the history and cultivation of this summer flower. * * * J. L. Vondel, Sharon, Mass. is the publisher. * * * We are fond of the gladiolus but we never have time to dig up the bulbs in the fall. * * * Tulips and daffodils look better to us. * * * Roswell B. Peters' "Laboratory Guide in Biology" comes to make us glad we do not live in the Empire State. * * * The book is excellent for the purpose intended, but it savors too much of the Standardized Course, with which New York is afflicted, to suit us. * * * We received some of our education in that State and remember the Regents exams. with feeling. * * * No, we did not intend to write with feelings of admiration. * * * We do not take stock in any brand of education in which a few of the elect tell the rest what to think. * * * Just imagine W. J. Bryan as Secretary of Education in the President's cabinet! * * * A reader sends us a picture of sixty-one wildflowers found blooming in December and January in the Puget Sound region. * * * About one-third are composites. * * * The celebrated climate of Los Angeles now has a worthy rival. * * * George B. Sudworth, of the Government

Forest Service is preparing a standard list of the common names of the Trees. * * * This makes four or five "Standards" by which we can estimate the correct name of a tree in America. * * * If only somebody would decide which is the standard standard!

* * *

What is the world coming to? Here is Sir Arthur E. Shipley writing of Biology as if it had something to do with life and actually daring to make a joke occasionally and to quote from such classics as "The Walrus and the Carpenter" and "The Toad and the Centipede". He says in his preface that he intended to write a book which would make students of elementary biology think. Well, he has done it all right, but what the solemn scientist will think about it will be good and plenty. Quite likely the latter will secure a copy and sneaking into his study, lock the door and smile in security, but in public he will feel obliged to frown on anything approaching levity in connection with science. And yet the book is good science and exact science. There is no trifling with the facts to make an entertaining tale. The author is simply alive and acts as if his subject were, too. He begins his volume by attempting to define life, quoting in this connection Dr. Johnson, Harry Lauder, Herbert Spencer and many others not forgetting the popular opinion that "Life is just one d——d thing after another"! All the life processes common to plants and animals are discussed with numerous interesting examples of each and at the end the author "ventures to hope that the book will not be without interest to the public that is not preparing for examinations" and thanks Heaven that this public is still in the majority. Not without interest? We'll say it is! Anybody from sixteen to sixty who picks it up is likely to read it through be-

fore laying it aside. The title of the book is "Life; a book for Elementary Students". It has 200 pages and many illustrations and costs $2.50. It is published by the Macmillan Co.

And here is a new issue of the "Garden of a Commuter's Wife" making nineteen in all, if we have reckoned correctly. The book first appeared, anonymously in 1901 and has proved itself a hardy perennial, indeed. It is not to be supposed that this is a literal guide to the cultivation of flowers and vegetables. Books of that kind do not have any such popularity. As a matter of fact, a better title for the book would have been "Fruits from the Garden of a Commuter's Wife" for its charm consists in the delightful narrative of the experiences which the author, Mabel Osgood Wright, makes the commuter's wife give of her attempts at renovating an old garden in Connecticut. A thread of plot runs through the book, concerned with the doings of the Commuter, the physician father, Mrs. Corkle, the Schmidts and various others. There is not enough plot to warrant the book's being described as a novel nor enough gardening to place it among horticultural works, but the mixture of the two is possibly more attractive than either would be alone. This is a book for the seasoned gardener rather than for the novice, but if the latter will use his mind as well as his hands he may work up to it in time. Perhaps he would do well to read it now, anyhow, just for the suggestions it gives of what may be gotten out of a garden besides flowers and foods. The book is from the Macmillan Press and is well printed. Somebody, however, should tell the printer that generic names of plants always begin with a capital. And how the book could go through nineteen editions and escape being called to account for its statement that Valentine's day comes on Feb. 15, is beyond

the comprehension of the reviewer. The price is $1.50 a copy.

Dr. L. H. Bailey's long-expected "Manual of Cultivated Plants" has at last appeared. Superficially it is like Gray's "Manual" but a closer examination reveals many features that suggest the author's "Cyclopedia of American Horticulture". It is very apparent that the author has worked with a sincere desire to enable gardeners, nurserymen and florists to identify the plants with which they work. Technical terms are reduced in number, the English equivalents being used when it possible to make the meaning clear in this way. There are clear and adequate keys to the families, genera, and species and the author has adopted the British custom of dividing the technical plant names after the accented syllable as *Dicen-tra, Frax-inus, Medica-go.* A good many of the names made from proper nouns have been decapitalized, but the geographic names still retain their initial capitals. This being a manual of cultivated plants, one searches in vain for even the showy flowers of our woods and fields unless they happen to have been taken into the garden, but in their places are a host of exotics. With many of these we may be familiar but find them listed here for the first time with their relatives from other parts of the earth. A pleasing feature of the specific descriptions is the matter of a more popular nature relating to the time of blooming, habitat, habit, uses, derivation of specific names, biographical notes, etc., that, as in the older Manuals, follow the more technical descriptions. Since so many of our cultivated plants come from the tropics it is no surprise to find the names of numerous families included that are not found in our ordinary handbooks. Among such are Proteaceae, Pittosporaceae, Bombacaceae, Myrtaceae and Sterculiaceae. The families have changed their relative sizes, also. There are only two species of *Carex* listed but a wealth

of palms, aroids, lilies, amaryllises, legumes, orchids, roseworts and others which are either decorative or possess handsome flowers. The Compositae are comparatively few in number owing doubtless to the fact that so many of the species though possessing bright flowers are yet too weedy to be admitted to the garden. The author is silent as to the brand of nomencature used though it is evident that he adheres to the Vienna Code. This is in a way to be regretted since the names fail in many instances to agree with those in "Standardised Plant Names" recently issued which deals with the same plants. This however, cannot be helped for a technical account of plants must be impeccable as regards accuracy. Incidentally we note that the genus *Euonymus* has its old name back without mutilation, that *Pentstemon* is spelled (correctly), *Penstemon* and that the horse-radish, which has previously been fitted into a number of genera such as *Cochleria, Nasturtium, Roripa,* and *Radicula* has been christened anew as *Amoracia rusticana* which is quite enough to make any vegetable hot. The only typographical error we have noticed is *Selinium* for Selenium. The book is really more than a manual; it is a condensed encyclopedia into which the author has inserted many bits of information not essential to the naming of plants but very welcome, nevertheless. The book contains more than 850 pages and represents a tremendous amount of work. It is to be regretted that all this makes it necessary to fix the price at $7.00. While this may keep some students from owning the work, it must be recognized that the day when a text-book could be purchased for a dollar or two has gone forever. Macmillan's are the publishers.

Growing the wildflowers may be regarded as a special branch of gardening, to excel in which requires an unusual amount of brains. Our ordinary garden flowers have been associated with man for so long that like some of our domes-

tic animals, they have largely lost the power to look out for themselves, but it is quite different with the feral plants. These latter have consulted their own tastes only and in consequence are often exceedingly particular as to soil, exposure, and various other matters. Those who have attempted to cultivate trailing arbutus, the pink lady's slipper, the huckleberry and bog plants, generally, are well aware of this. Not only may wild plants languish in our gardens, but their seeds often refuse to grow, unless they are specially treated. Inducing such plants to grow, therefore, becomes an accomplishment that may come as a fitting climax to many adventures. Recently Herbert Durand has attempted to help matters along by the publication of a book with the title of "Taming the Wildings". The book is uniform in size with the well-known field-books of Schuyler Matthews and the text also suggests these books, but here the resemblance ceases for the author begins with a discussion of natural soils and their treatment and follows this with directions for treating trees and shrubs and a list of the best varieties. Then come chapters on herbaceous plants and their cultivation, including descriptions of 184 of the best kinds and the book ends with further chapters on hardy ferns, heaths, plant protection, wildflower and bird sanctuaries, rock gardens, etc. In the case of desirable plants the author indicates which may be transplanted from their haunts, which should be purchased and which are so rare that they should be protected in the places where they grow. At times one is inclined to disagree with recommendations of this kind. The common clematis, the May-apple and the bittersweet, for instance, do not appear so difficult to transplant or so rare that one needs to buy them, nor do the bluebells (*Mertensia*), wild phlox, or wild indigo need to be given sanctuary. Indeed, the last-mentioned becomes a real weed in proper situations. One

is likely to allow his own experiences to color opinions of this kind. These, however, are minor defects to be overlooked especially as the author always errs on the safe side. There are a large number of excellent illustrations and it is quite certain that the book will do much, not only to make our wildflowers more popular as garden subjects, but paradoxical as it may seem, lead to their greater conservation in the wild. All amateurs will have need to consult it frequently. The novice will probably be astonished at the number of our native plants that are considered worth growing. The book is published by G. P. Putnam's Sons, New York, and costs $3.50.

Anybody contemplating the publication of a local flora and searching for a model would do well to consult Ellen D. Schulz's "500 Wildflowers of San Antonio and Vicinity". This is just such a book as any lover of wildflowers would delight to find upon going into a new locality. The plants are arranged in families with adequate keys for their identification, but this is not what makes the book attractive. It towers above similar works in its method of describing the species. The author has not found it necessary to mention each part of each plant in technical language but has instead given a clear and accurate word picture of each, emphasizing only those features which render it attractive or serve to distinguish it from its congeners. Ecpecial attention is paid to the common names of the plants, the time of blooming, uses and similar subjects. As one looks through the book he is reminded of the work of the earlier botanists written when botany was still the "amiable science" and its devotees had the time to express the interet and admiration they felt for the wildflowers, as well as to record the shape and texture of each plant part. From this book one is likely to feel that he can soon get a working knowledge of the San Antonio flora. There are nearly fifty illustrations of important spe-

cies which, though not essential to such a work, are nevertheless desirable. This is probably the best book of Texan botany for the novice. It contains 250 pages and is for sale by the author at 1025 Summit street, San Antonio. The price is $2.50.

"The Pharmacist's Botany" by George B. Riggs, is intended primarily for students of the drug plants and therefore omits much that ordinarily goes into a general course. The book, however, gives a short account of each plant part and then mentions the uses of such parts in pharmacy. The so-called spore plants are discussed briefly and the contribution they have made to drug plants mentioned. The most interesting and attractive part of the whole work is that devoted to the classification of seed-plants in which practically all the species used in medicine, both official and unofficial, are mentioned under their respective families. The student of medicinal plants might possibly welcome a more extended discussion of the principles found in drug plants with perhaps some account of their preparation for use. There are no directions for the laboratory work and the book is evidently intended more as a source of information than as a stimulus to further investigation. The book, however, is the outcome of the author's fourteen years experience in teaching the subject and ought to meet the requirements in its particular field. We note that the printers have stumbled over the word hawthorn. Unlike the well-known author, the plants of this name do not spell it with an e. The book is published by the Macmillan Company, New York, at $4.

The appearance of a new book for beginners in botany from the Cambridge University Press again emphasizes the fact that beginning courses are of necessity pretty much alike. Except for the plants suggested for study, the book might well have been written on this side of the world. The new

volume, entitled "Botany;a Junior book for Schools", by R. H. Yapp of the University of Birmingham, contains twenty-seven short chapters, which beginning with the flower and its uses runs on through roots, stems, and other plant parts. Then follows matter of an ecological nature, stressed under such titles as "How plants Pass the Winter", "The Movements of Plants", "The Migrations of Plants" and "The Relationships of Flowering Plants". Our students, however, might properly be confused by references to unknown but common British plants such as sycamore, the broad bean, and the groundsel the latter described as "a very familiar weed". The book runs rather too much to technical terms to suit the majority of American teachers but it is apparent that the student taught by this book will be well taught. The illustrations, mostly by the author are clear, original, and attractive. The book is published in America by the Macmillan Company.

The sports of hunting and fishing offer their temptations to a greater number of young persons, but they do not afford continued pleasure to their votaries, like botanizing. The hunter watches his dog and the angler his line, but the plant-hunter examines everything that bears a leaf or flower. His pursuit leads him into all the green recesses of nature—into sunny dells and shady arbors, over pebbly hills and splashy hollows, through mossy dingles and wandering footpaths, into secret alcoves where the hamadryads drape rocks with ferns and naiads collect the dews of morning and pour them into their oozy fountains for the perfection of their verdure.—*Wilson Flagg.*

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WILLARD N. CLUTE, EDITOR

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E. J. WINSLOW, Auburndale, Mass

The Spring Beauty.—*Claytonia Virginica.*

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Never in its life has the sun seen shade,
Never in its life seen a shadow where it falls;
There, always there, in the sun-swept glade,
It lurks below the leaf, behind bodies, under walls,
Creeps, clings, hides—be it million, be it one—
The sun sees no shadow and the shadow sees no sun.
Lawrence Housman.

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THE SPRING BEAUTIES

By WILLARD N. CLUTE

IT is scarcely necessary to write of the spring beauty for those who live within its range. From Nova Scotia to Saskatchewan and south to Texas and Georgia it is a common and well-known plant in all suitable localities. It is especially fond of low woods and the banks of streams, but is disposed to shun the prairies and open spaces generally. Those who have suggested that this plant be protected by law must be residents of grassland regions.

That the plant is in no need of protection in parts of its range, at least, is seen from our frontispiece which was made from a view in a piece of wild woodland near Joliet. Here the earth is so thickly strewn with blossoms and to give it the appearance of being covered with belated snow-drifts.

Although so abundant the flowers are rarely gathered in quantity because the individual blossoms are rather evanescent and do not open well in the house. It seems to require

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both warmth and sunlight to fully expand the corollas and in their woodland haunts the flowers are seldom entirely open until ten o'clock.

The usual color of the corollas is white, but the deep pink veins of the petals give the flower a decidedly pink hue. Occasionaly they are pink throughout and the writer has a plant in his garden that is uniformly deep rose-color. The flowering stems spring from a roundish tuber-like stem deep in the soil. This is edible and is said to taste like chestnuts when boiled.

There are supposed to be two species of spring beauty in eastern America. The common one is *Claytonia Virginica*. It has slender leaves and many flowers in racemes. The second species is named *C. Caroliniana* and is described as having broader leaves and fewer flowers. The writer has found many plants with leaves up to nearly an inch broad, but thus far has failed to find plants that looked sufficiently different from *C. Virginica* to be regarded as a separate species. If any reader of this has *C. Caroliniana* in his region, the writer would appreciate a leaf or flower-cluster.

A PLEA FOR ARBITRATION

By Norman Jefferies

THE hope that Mr. Roger Sherman Hoar would furnish corroborative testimony in support of his claim to discovery of blue dandelions or, after enlightenment or reflection, would confess either error or playful jest, is not sustained by reading his latest article in the *American Botanist*.

Mr. Hoar feels it necessary to reveal me as "by profession a creator and purveyor of side-show freaks, and a

botanist by avocation." For me to retort that my accuser is very well known to be an authority on constitutional law, and, obviously, not a botanist by avocation, would contribute nothing to the point of the discussion. That point is whether or not there is a plant that may be correctly called a blue dandelion.

Mr. Hoar is on record with positive statements that he has found blue dandelions in Virginia, Massachusetts and Wisconsin. The editor of the *Atlantic Monthly* who published the discoverer's account of the plant which, if verified by reasonable authority, would electrify botanists the world over, has stated in a letter to me that he knows a dandelion when he sees one and that he has both seen and handled the blue dandelions in question. To which he adds that he must either believe in them or doubt the credence of his own senses.

With the vagaries of variation in mind the editor of the *Botanist* is willing to infer that "once in a blue moon there may be a blue dandelion." Even amateurs will agree with Mr. Clute's pleasant way of expressing a biological truism. But we have been asked to believe that blue varieties of a species so prolific and fast running as *Taraxacum* have existed in three widely separated localities without the knowledge of botanists, both amateur and professional.

My cherished botanical avocation is confined to an effort to become acquainted with the flowers of field and roadside, the floral wild folk frequently miscalled weeds. The bibliography of the subject is voluminous enough to cause despair to the collector. My own library is sadly incomplete and yet it numbers many works from first editions of old herbals by Gerarde, Parkinson, Turner and Fuchs to present day treatises. They cover a period of nearly 400 years during which no blue dandelion has been recorded and the oc-

currence of such an extraordinary floral phenomenon could hardly have escaped all of these vigilant eyes. Thus it is that the imputed existence of the blue dandelion that has concealed itself from all eyes but those of Mr. Hoar and the editor of a Boston magazine cannot fail to excite doubt among students of botany.

Mr. Hoar refers to a creation of my own imagination, the "Jersey Devil" and recalls that "finally the perpetrator of the hoax cashed it in by capturing and exhibiting the beast." I ask him to note that thus and in such manner did I give the public a chance to see for itself and draw its own conclusions. If Mr. Hoar can be persuaded to do something of the kind, the blue dandelion controversy can be settled for all time. He speaks of his "twenty-foot row of blue dandelion plants" which "although flourishing with a tropical luxuriance, has not produced a single seed." With restraint I refrain from italicizing one or two words in the quoted sentences.

It will be conceded that the editor of the *American Botanist* would be a competent arbiter in a matter of the kind and it is fair to assume that from his "twenty-foot row of blue dandelion plants" the fortunate owner will be willing to spare one specimen for Mr. Clute's inspection and classification. This, as it seems to me, would be the short and straight road to either authentic recognition or repudiation of the genuineness of Mr. Hoar's discovery. And in the event that it is officially decided that in the procession of botanical science the marchers are all out of step but Mr. Hoar and the *Atlantic* editor, I want to be the first to suggest that the new variety be named after the sharp-eyed discoverers.

An article in the *Botanist* in which I expressed belief that Mr. Hoar would share the fruits of his "discovery"

with less favored plant collectors resulted, as he states, in bringing to him requests from "flower-lovers from all over the United States." This may be accepted as evidence of the wide-spread interest that would be given to an authoritative classification by Mr. Clute.

With the hope that Mr. Hoar may be induced to submit one of his luxuriant specimens in time for decision in the coming issue I am sending him a copy of this proposal. And should be acquiesce I am sure that in the forthcoming number of the *American Botanist* a good time will be had by all.

THE PIONEERS OF BOTANY

MAN'S first interest in plants was undoubtedly connected with his need for food. From the very beginning it was necessary for him to know which plants were edible, which were harmless and which actually harmful, if he was to maintain or advance his interests among living things. The word botany, itself, under which we now arrange all of our knowledge relating to plants, comes from a Greek word meaning to eat and indicates how closely plants and foods were associated in the minds of our primitive ancestors. Originally all food came from wild plants, but the desire to live well and to enjoy the best must have ultimately suggested the cultivation of the more useful species.

Plants other than food plants that early engaged man's attention were those used in divination and incantations, in charms, for garlands and other decorations, and lastly as medicines. Among uncivilized peoples, however, there was seldom any great distinction made between herbs used for sorcery and those used for healing, and priest and physician were commonly combined in a single person, the medicine

man. It is likely that for ages man's interest in plants did not go much beyond the phases here mentioned. In the course of time, however, a considerable body of useful information about plants must have accumulated, derived largely from the experience of hunters, fishers, farmers, physicians and others who came into contact with wild plants. At first this knowledge was probably handed down from father to son, but as it increased in amount it was ultimately written down for better preservation.

Just who wrote the first book on plants it would be impossible to say. At a very early date the Greeks, Arabians, Egyptians and other eastern peoples had a considerable knowledge of plants and there is even said to have existed a treatise on medicine as early as the fifteenth century before Christ. The Greeks, especially, took a keen interest in all phases of nature and they were among the first to regard plants as living things and not merely as food materials. Undoubtedly many books about plants were written and since completely lost to the world. The first about which much information has been handed down to us was written about 400 years before Christ by a Greek named Aristotle. The treatise itself is unfortunately lost but much of it is familiar to us through references to it by later writers. Aristotle's father was court physician to the Macedonian King Amyntas and, since the early physicians gathered the herbs and made the medicines they used, the boy undoubtedly grew up in a botanical atmosphere. At the age of 18 he went to Athens where he studied in the school of the great philosopher, Plato, and later became the teacher of the young Alexander, renowned as the conquerer of the world. Aristotle's writings are said to have comprised more than 300 books on almost every phase of human knowledge. He is often styled the "Father of Natural History" and is said to have had

an idea of what we regard as the modern subject of evolution.

After the death of Aristotle (in 322 B. C.) Theophrastus, another Greek physician who has been associated with him in a school at Athens, wrote a book of his own entitled "The Natural History of Plants" which was founded mainly on the observations of the rhizotomei or herb gathers. In this he described more than 500 species of plants. For several centuries after this, no book about plants important enough to be remembered was produced. The next work of which we have knowledge was a fifteen volume work on "Materia Medica" or history of medicinal plants written by Pedanius Dioscorides who lived in the first century after the Christian era.

Among the Romans, the name of Gaius Plinius Secundus, or Pliny the Elder, holds first place in the list of writers on nature. Pliny was born in the year 23 A. D. and near the end of a busy life issued his famous "Natural History of Plants" consisting of 37 volumes. This work, like many of the early books, was largely a compilation of the thoughts and observations of others. In composing it he is said to have consulted no less than 200 volumes. It was his habit to make copious notes of all he read and at his death he left 160 volumes of such notes. Pliny's thirst for knowledge at last led to his death. In the year 79, an eruption of Mt. Vesuvius overwhelmed Herculaneum and Pompeii. Pliny, who was in command of the Roman Navy, was with his fleet in the Bay of Naples and going ashore to better observe the occurence, lingered too long to make notes and perished with many of the inhabitants.

For many centuries after Pliny and Dioscorides, little if any advance in botany was made. The fall of the Roman Empire about 500 years after Christ, and the overpowering of the intellectural nations by others hostile to culture, ex-

tinguished the light of learning in Europe for more than a thousand years. During the Dark Ages as this period was called, such scientific knowledge of earlier days as survived was preserved in monasteries and similar institutions. A knowledge of plants was kept alive by the necessity for cultivating food and medicinal plants and passed on from father to son. Occasional books on the subject appeared, but their authors seem to have been chiefly engaged in repeating the statements of the Ancients and in endeavoring to make the plants of their own regions agree with the descriptions of Greek plants.

Toward the end of this period the "doctrine of signatures" had a great vogue under the leadership of Bombastus Paracelsus, a Swiss, born the year after Columbus discovered America. Bombastus taught that all plants were created for the good of man and bear upon them signs or "signatures" of their uses. This appealed with special force to a population strongly inclined toward a belief in witchcraft and magic. According to the doctrine of signatures, a plant with red juice is good for the blood, a plant with three-lobed leaves is good for the liver and so on. Some of the common names of plants still bear witness to these curious beliefs as instanced in spleenwort, eyebright, heartweed, lungwort, liverwort, bloodroot, kidneywort, and lousewort.

Other beliefs current when the doctrine of signatures was in repute, still have their adherents in out-of-the-way communities. Divining-rods made from twigs of peach or witch-hazel are still used by the credulous to locate "veins" of water and hidden treasures. And though we no longer believe in the mystic "fern-seed" that will make one invisible, in the moonwort that has power to pull the shoes from the newly shod horse, in the spring-wurzel plant which will open any lock it is laid upon, or in the mandrake plant which

cries and groans when it is pulled up, making all who hear it insane, there are still those who carry a horse-chestnut as a charm against rheumatism, or use the milk from the spurge to cure warts.

PLANT NAMES AND THEIR MEANINGS—XX

MALVACEAE

By Willard N. Clute

THE technical botanist delights in plant groups in which the species are so nearly alike that he must exercise all his powers of observation to distinguish between them, but those who do not rejoice in taxonomy for taxonomy's sake usually prefer genera or larger groups in which the species have an individuality of their own—species that may be distinguished at a glance or even identified from descriptions previously read. Thus it happens that the grasses, sedges, violets, brambles, and hawthorns intrigue the closet naturalist while the lilies, heaths, and other genera with conspicuous flowers attract the attention of the less technical flower-lover.

The mallow family belongs distinctly to this latter class. There are plants in it, to be sure, with insignificant or inconspicuous flowers but these are greatly outnumbered by species with showy blossoms. Flowers six or eight inches across are not uncommon and the colors range from yellow and white to the most brilliant scarlet. The structure of the flowers in this group makes them easily recognizable for in all our common species the stamens are built up into a stamen-column surrounding the styles which once seen is likely to be remembered. Though there are some fifty genera and nearly a thousand species of Malvaceae, they are for the

most, part in the warmer parts of the world and comparatively few occur in eastern America. Even these latter are not all native but have come to us from other parts of the world with other immigrants.

The genus *Malva,* represented by the musk-mallow, widely escaped, and the low mallow, a common weed, gives the name to the mallow family. *Malva* is derived from an old Latin or Greek word meaning "soft" or "to soften" and refers to the emollient leaves of many of the species. It is interesting to note that mallow or words of similar sound indicate the plants of this genus in most European languages and that the French *mauve* means the same thing. *Malvastrum,* the name of a related genus is said by various authorities to signify mallow-like, but the Century Dictionary derives it from mallow and a word for star and says it is properly "star-mallow" because the flowers have five bracts arranged in the form of a star. As a mere name, we prefer the latter, though rather convinced that the first derivation is the correct one.

There seems to be no doubt that *Sphaeralcea* is another name built on a word signifying mallow and a word for sphere, the latter alluding to the inflated carpels. Allied to this, and referring to the medicinal virtues of some of its species, is *Althaea* from the Greek meaning "to cure." In *Modiola* we have a Latin term derived from the Roman measure, modiolus, suggested by the fruits. *Napaea* is the Greek for dell and alludes to the wooded valley in which the botanist Clayton, first found the plant. The generic name of the poppy-mallows, *Callirhoe,* is a mythological name applied to one of the Oceanids and means, literally, "beautiful flowing." The names of *Sida* and *Hibiscus,* given to two other malvaceous genera are said to be ancient names, the first given by Theophrastus to some ancient Greek plant and

the second applied by Dioscorides to the marsh mallow. The famous Arabian physcian, Avicenna, gave the name of *Abutilon* to a genus of mallows more than a thousand years ago, but the significance of the name is not clear. Last in the list is *Kosteletzkya* named for the Bohemian botanist, V. F. Kosteletzky.

The plants of the Malvaceae are so universally called mallows that it is difficult to say which are the true ones. Since the genus *Malva* is the leader of the family we might infer that the species it contains are so well entitled to be known as *the* mallows as any. The best known and most abundant species is *Malva rotundifolia* an insignificant weed but known to children as "cheeses," and "pancake-plant" because of the round flat groups of ovaries which are edible when young. Other words of similar significance are "doll-cheese," "fairy-cheese," "Dutch cheese" and "cheese-flower." No doubt "button-weed" has the same origin. The plant spreads about on the ground in waste places and produces many pink-white flowers which gives reason for most of its other names, notably "low mallow," "dwarf mallow," "common mallow," "running mallow," "country mallow" and "blue mallow." In some sections the word mallow has been corrupted into "malice." We have no idea what the name of "pellas" applied to our plant by Britton may mean.

The musky odor of the blossoms has evidently given the name of "musk mallow" to *Malva moschata.* Other names for it are "musk," "musk rose," and "musk plant." The species may frequently be found in the waste lands near the earlier settled parts of our country. Very much like the musk mallow and occasionally found in the same places is *Malva alcea* the "European mallow" or "vervain mallow." It is difficult to see any resemblance in this plant to any species of verbena with which we are familiar and the reason

for the name is obscure. The "whorled mallow" is *M. verticillata,* so named for the arrangement of the leaves. It is also known as "curled mallow," doubtless because the general public, failing to understand the significance of the technical term, whorled, uses a word that it can understand though in this case it means nothing. The "high mallow" is *M. sylvestris.* From the resemblance of its young ovaries to those of the low mallow, or perhaps simply because they are round and flat, the species is also "cheese-flower," "cheese-cake" and "pisk-cheese," the latter possibly derived from pixie and therefore signifying fairy cheese. Though several names have been derived from the circular cluster of ovaries the name of "round dock" probably refers to the leaves which are roundish, though the term would be better applied to *M. rotundifolia.* "Marsh-mallow," applied to this plant, is clearly a misnomer while "maul" or "mauel" appears to be another attempt to pronounce mallow.

The true marsh-mallow belongs to the genus *Althaea.* Its use in medicine is well known and this is further indicated by the specific name *officinalis* which means "kept in the shops." The plant is an interesting little species, originally the source of the confection widely known as marshmallows. The plant, however, does not appear partial to wet places, at least it grows well in any good garden soil. It has, however, been suggested that the name should be "mash mallow" and so named from its use in making poultices. Further medicinal uses are indicated by such terms as "sweat-weed" and "mortification-root." "Wymote" is of no significance, so far as we are aware. The name of "white mallow" is supposed to be in allusion to the medium-sized white flowers but is is as well applied to the white-downy leaves. The only other member of the genus *Althaea* in our region is the "hollyhock" (*A. rosea*) which appears to have originally

been "holy hock" because first brought from the Holy Land by returning crusaders, "hock" being an old name for mallow.

Far more partial to wet grounds than the marsh mallow are the various species of *Hibiscus*. Though occasionally called "marsh mallows," they are more often known as "rose mallows." It must be admitted, however, that they have a very ancient claim to being "marsh mallows" for Dioscorides called them so more than 2500 years ago. The commonest species is probably the "swamp rose mallow" (*Hibiscus moscheutos*) a tall plant with large rosy flowers that delights in standing water. Its other names, "swamp mallow," "water mallow," "marsh mallow," "sea hollyhock," and "mallow rose" are readily intelligible. It is often common along the Atlantic coast and with it grows an almost identical plant (*H. oculiroseus*) with the exception that the flowers are white with a crimson eye. For a long time it was regarded as an abino form and its common names still indicate the fact for it is known as the "crimson-eyed rose mallow," and "white rose mallow." "White hibiscus" appears to be a recent appellation. The "halberd-leaved rose mallow" (*H. militaris*), otherwise known as the "halbered leaved mallow" and "sweating-weed" is a third form that delights in wet places.

Two other species classed with the rose mallows are *H. Syriacus*, the shrubby plant commonly called "rose-of Sharon," and a diminutive relation, *H. trionum* known as "flower-of-an-hour." One sometimes wonders how this insignificant weed and an almost tree-like species happened to get into the same genus. *Hibiscus Syriacus* is also known as "shrubby althaea" and "tree hibiscus." In some respects its diminutive ally (*H. trionum*) is a remarkable plant. It is a rank looking weed, but with rather large flowers that might redeem it were it not for the fact that they are ex-

tremely evanescent. They open only to close and disappear. The term "flower-of-an-hour" is altogether too complimentary though fairly appropriate. It is also known as "modesty" and "shoo-fly." The dark centers of the flowers make the name of "black-eyed Susan" significant while "bladder ketmia" alludes to the inflated calyx and the fact that *Ketmia* was once used as the name of a section in the *Hibiscus* genus. "Venice mallow" may refer to the place where the species is abundant or, perhaps, like "devil's-head-in-a-bush" it may have no special significance.

The Indian mallow or velvet-leaf (*Abutilon Theophrasti*) is a ubiquitous weed in fields and waste grounds. The yellow flowers are small and inconspicuous but the seed-pod is a curious affair with radiating points at the top and is well known to many by sight at least. From the appearance of this pod has come such names as "piemarker," "pie-print," "butter print," and "butter weed." Probably "button-weed" also alludes to the form of the capsule though it sounds like a mispronunciation of butter-weed. "Velvet-weed" like "velvet-leaf" refers to the very soft-downy leaves while "wild okra" is given for the resemblance of the plant to the "okra" or "gumbo" (*Hibiscus esculentus*). The plant yields a fair quantity of fiber from which circumstance it is called "American hemp," "American jute" and perhaps "cotton-weed." The plant came originally from India, hence "Indian hemp" and "Indian mallow." We are at a loss to know the origin of "sheep-weed" or of "Mormon-weed" also applied to our plant.

The poppy mallows are low half-vinelike spreading perennials and are familiar from being cultivated in gardens. The "fringed poppy mallow" (*Callirhoe digitata*) is also known as "wine-cup" and "wild hollyhock," both names being self-explanatory. *Callirhoe involucrata* is the "purple poppy

mallow" *C. triangulata* is the "clustered poppy mallow" while *C. alceoides* is simply "poppy mallow" without special qualifying adjectives.

Our two species of *Malvastrum*—*M. angustum* and *M. coccineum*—are known as the "yellow-" and the "red false mallows," respectively. The second species is also called "prairie mallow" and "moss rose," the derivation of both names being apparent. *Modiola Carolina* is the "bristly fruited mallow" and *Sida spinosa*, as its name indicates is the "prickly sida." This latter species is another "false mallow." It has also been confused with the Indian mallow and is sometimes called "wireweed" probably from some reference to its stems.

Completing our list are two remarkable species, the "glade mallow" (*Napaea dioica*) which is different from most mallows in being dioecious, that is, with stamens and carpels on different plants, and the "globe mallow" (*Sphaeralcea remota*) which, if the manuals are correct, is now limited to a single plant in the writer's garden. This plant is also called "maple-leaved globe mallow." It is closely related to a western species but the Manuals hold that the plant which once luxuriated on an island in the Kankakee river in Illinois is a distinct species. If this plant is distinct from the western form, all that remains of it is the specimen mentioned, the original locality for it having apparently been destroyed.

THE TAROS OF TAHITI AND THE MARQUESAS

By J. O. Stancliff

TARO, which is very similar to caladium, or elephant-ear, and has a cultivated prototype, the dasheen, in the Southern States, exists in Polynesia in several distinct varieties. *Ape,* the most conspicuous, is sometimes known as the giant arum. It lifts its enormous, shining, dark green leaves from stream beds and swampy places throughout the islands. Unlike our caladium, *ape,* is useful as well as ornamental. I understand its stems can be pounded up and baked in bamboo stems, and also that the roots may be eaten, though you must bake them throughout a night with sugar, or some equivalent process. The leaves are perhaps twice as large as caladium leaves, or as large as an ordinary window.

The ordinary edible taro (considered classable under *Colocasia esculenta*) is likewise a beautiful esculent. Often have I feasted upon its roots in Tahauku, a wild Marquesan vale of the sun-kissed isle of Hiva-oa, overhung with rocky, cloud-encircled heights. The stems are delicately tinged with purple, the velvety, light green leaves show silver backs when immersed in the stream, and it seems almost a sacrilege to despoil a creek of its waving leaves. After I had eaten many taro roots in Tahauku, the natives' gods became angry and sent a freshet, which for several days filled the crystal-clear creek with a rushing brown current, sweeping before it every taro leaf, and leaving the songful creek of Tahauku terribly bare for a time.

But growth is rapid in these sunny climes. One of the rare tidal waves, arriving about three weeks ahead of me in

Tahauku, had brought a formidable flood of salt water, sand, boats, wreckage, etc., but apparently did small damage to the taro, which I found waving pleasantly in the shallows.

A distinction between this species and the dasheen might lie in the fact that the latter produces cormels in cultivation, which I do not think is true of taro. It is mealy and pleasant-flavored, and tastes like waxy potatoes, with a suggestion of chestnut, just the same as dasheen. There is, however, at least in the wild specimens, a distinct acrid taste in both roots and leaves, which must be boiled out of them,—unlike the dasheen, which you must not boil too long.

My method of preparing wild taro was to wash off as much of the clinging muck as possible, peel off the rest of it and the skin with its adhering fibrous rootlets in one operation, and then boil the resultant tubers, sliced to potato size, until the water boiled out, when I would refill, repeating this operation twice; after which the taro would come out blackish and very palatable, and especially fine eaten with ripe bananas and the milk expressed from coconut gratings.

A third kind of taro is cultivated by the natives of the northeasterly, or wilder, bridgeless side of Tahiti, and called *tarau*, or perhaps *apura*. The close resemblance of its leaf to our caladium leaf is remarkable. It is deemed a variety of *Colocasia antiquorum*, which species also includes Egyptian taro and the blue tania of our southern Atlantic Coast region. This taro, in my opinion, is not so handsome as the taro I have just described. The natives find it very good for food. A fourth species I stumbled upon by accident in a swamp. It had somewhat thorny stems, and was probably not used for food.

CONSPICUOUS TROPICAL PLANTS

(Concluded.)

IN driving out into the country near Honolulu you are surprised to find how few wayside wild flowers there are. You look in vain for anything corresponding to our buttercups, daisies, sunflowers, golden rods, gentians or asters. You may, very rarely, see a forlorn May-weed—the plant was introduced long ago, but does not thrive and multiply. The bright colors are almost absent. Yes, there are white poppy thistles (*Argemone Mexicana*), as fine as you will see on our western plains; and over rocky ledges you may see spread a mantle of convolvulus with profusion of blossoms, perhaps white striped with pink, perhaps blue, pale but vivid, changing in the afternoon to pink; and here and there the sand near the shore may be carpeted with Nohu (*Zygophyllum tribulum*), and surely nothing could be more gay than the gold of its delicately fragrant blossoms—Mahukona violets they are called locally. But for the most part the flowers by the wayside are inconspicuous and of dull colors.

But you have forgotten Lantana! No, "that is another story." Lantana cannot be counted as a wayside wild flower. Originally introduced as a garden flower, it has taken possessions of all the land, and would leave no road at all, if perpetual warfare were not waged upon it. Gay enough it is, but with calico colors covering hill and dale and field, you look in vain for the individual prize which you could bring home as a wild flower.

Returning to the city, where Lantana is proscribed, we look about for garden flowers. In place of flowering plants

you will find bordering the driveway and about the dwelling, foliage plants and ferns rather than flowers. A neighbor has perhaps an arbor covered with a Bougainvillia vine. When its blossoming time comes, the deep green of its foliage will be flecked at first with ruddy purple—more accurately magenta—soon the patches of color spread and become confluent until the whole arbor is a solid mass of color. It seems like an experiment in decorative art belonging to a primitive and barbaric stage. You are not sorry to find that nature has not repeated it. What is remarkable is that it is not the flowers of the bougainvillia that are thus colored. It is only the bracts enclosing the inconspicuous flower clusters.

Another vine often trained over porches and barns, a bignonia, but unlike our trumpet creeper, makes the bougainvillia envious when it puts on its gala day dress. Here again is solid color, but no longer the suggestion of the dye vat. It is the color of living flame, not uniform in tint, but with lights and shades such as belong to veritable flame, and the plant wears this gorgeous attire, wholly concealing the every-day garment of green which it covers, for weeks at a time.

More prized, but less common, is the stephanotis, whose fragrant clusters in their season transform the trellis into a snow bank. The same snow effect is produced when the ungainly fleshy stems of the night blooming cereus (*Cereus triquetra*), which are piled up on stone fences, making the semblance of an evergreen hedge, clothe themselves, as they do once in three or four weeks, through the summer months, with their giant lily blossoms. There is one of these hedges at Oahu College, a continuous stretch of two hundred yards, on which it is a common thing to see two thousand blossoms at once—sometimes there have been

two or three times that number. Of course this snow melts under the morning sun. By 9 o'clock in the morning the glory is departed, although the following night may see it restored. The plant blossoms two nights in succession, with perhaps a few belated flowers for the third night, or a few that anticipate the general blossomings—then there will be a rest while a new crop of buds develops. The flowers are provided each with a score of stigmas and a thousand stamens (by actual count); they are visited by swarms of honey bees and by other insects, and yet very rarely indeed is fruit matured. Only twice in thirty years, I believe, has fruit appeared, a very few each time, on the hedge I have just spoken of.

But trees vie with vines and humbler plants in decking themselves in lively colors. With us in the temperate zone, the blossoming time of a tree is of necessity short, and it must come generally not later than June or early July. The flowers, if colored at all, are generally white, the Tulip tree, Judas tree and a few Rosaceae forming the principal exeptions. Among tropical trees the colors are often brilliant, and the blossoming season may be greatly prolonged, and trees of the same species do not necessarily put forth their blossoms the same week or the same month even.

It is trees of the Cassia family (Caesalpineae) especially, that light up with color the spacious grounds around Honolulu residences. Yellows are perhaps the most common. The species of *Cassia*, which are shrubs or shrubby climbers rather than trees have all yellow flowers, and most of them are perennial blossomers. The *Caesalpinias* are sometimes shrubs, sometimes large trees, the blossoms being again commonly yellow. A very beautiful tree of this genus is the so-called yellow poinciana, with its massive head of finely cut foliage, the ample flower clusters giving way to purple pods so

numerous as to give to the whole tree their ruddy hue. The *Bauhinias*, sturdy climbers or small trees, remarkable for their two-lobed leaves (whence named for the two brothers Bauhin), give preference to pink and red rather than to yellow. In the St. Thomas tree the petals of the showy flowers have crimson spots on a paler ground, having been sprinkled, according to the tradition, with the blood of the martyred saint.

Very conspicuous throughout the summer months is the tree known in Honolulu as the golden shower; more prosaically as the pudding-stick tree; to pharmacists familiar, as purging Cassia, (*Cathatocarpus fistula*). The foliage is comparatively scanty, consisting of pinnate leaves with large entire leaflets. The cylindrical, deep brown pods, fifteen inches or more in length and three-quarters inch in diameter, are rather ornamental than otherwise as they sway with every breeze. In spring the buds appear in drooping panicles, and then for four months there is a continuous succession of the pure primrose-yellow fragrant blossoms that justify the popular name of the tree. The petals, which are of such a delicate bright color, are really coarse in texture, and this explains why they last as they do ten days or a fortnight without noticeable change.

Another species of the same, or a closely allied genus, has foliage resembling that of our locust tree, but with a peculiar graceful droop to its massive frond-like sprays; has pods that are similar, but longer, more slender, and slightly constricted at regular intervals of about a centimeter. Internally their structive is quite differnt; in the purging cassia the pod has transverse diaphragms separating the seeds, which are imbedded in pulp. In this species each seed is enclosed in a tiny box of woody texture, yet with walls not thicker than bristol-board. These little cells, in size and shape much

like old-fashioned gun-wads, lie inside the pod exactly like so many coins rolled up in brown paper. The flowers are produced in clusters, which closely surround the bough of the previous year's growth. They resemble in size, shape and color the largest, deepest colored crab-apple blossoms, but the tree remains apparently in full bloom ten or twelve weeks, a joy to the eye to behold. There is in fact, as in the golden shower, a succession of blossoms, no one lasting probably more than about ten days. The only name known for the tree in Honolulu is simply Cathartocarpus. I have never learned its true botanical name.

I have left for the last mention of a genus which must be the first to attract the attention of the stranger, viz., *Poinciana*, nearly related to *Caesalpinia*. One species forms a rather straggling shrub, ten feet high, with thorny branches, and is known commonly as Pride of Barbadoes or as Barbadoes Flower-fence, the scarlet and orange blossoms, with crimped petals and long exserted stamens forming stately pyramids of bloom, each raceme occupying a month or more in expanding its numerous buds. A second species, Sappan, is very similar, except that the flowers are of an orange yellow color.

A third forms a fine tree of medium size, the smooth trunk expanded at the base laterally into buttresses corressponding to the principal roots, the foliage arranged in horizontal spreading layers and consisting of regular mimosa-like leaves as beautiful as the fronds of a fern. Were it not for the great coarse pods, twelve to sixteen inches long by one and one-half inches wide, you would say that in the freshness of its new foliage at the close of the rainy season, it had not peer for beauty among the shade trees of the city. By and by it begins to put on its summer adornments. Here and there burns among the branches a dazzling grow of

crimson. Day by day new flames burst out, and then they spread and coalesce, until the entire tree is ablaze. How the landscape is lighted up by these masses of solid color! In another tree such gaudiness of attire would seem vulgar. Here it is regal. Gold and crimson belong of right to this queen, for whom it is right, too, that the ground beneath should have its thick-piled carpet of the unfaded petals. There are other plants equally embued with a passion for brilliant color—the cardinal flower of the meadow, the Zeuchneria of California hillsides, the Atamasco lily, the scarlet salvia, the rose and carnation of the gardens, but where among them all is one who can pour forth her passion in any such lavish creation? Well is the tree named *Poinciana regia.*

THE FIGHT AGAINST THE POTATO

WHAT would we do without the potato? None is so poor that he cannot afford to eat it. None is so rich that he can afford to disdain it. If all the potato plants of Europe should perish and prove irreplaceable a large part of the population would have to starve or emigrate. Yet people fought the potato as though it were the plague when it was first introduced into Europe. They were used to the plague and regarded it as proper punishment for their sins, but the potato, coming from the wild west of America, was new and therefore to be feared.

Sir Francis Drake is supposed to have brought the potato to England in 1586, having perhaps taken the tubers, in the course of one of his privateering cruises, from some Spanish vessel, together with other less valuable booty, such as gold and gems. Anyhow, he is credited with it by the Germans

who erected a monument in his honor at Offenburg in 1854 and struck off a medal to the British Admiral as the savior of Germany in 1916 when a big potato crop enabled them to hold out another year. But such honors always come by slow freight. It took people a hundred years or more to learn that potatoes were good for them to eat. They fed them to their pigs and cattle which, not having the prejudices of rational men, took to them readily.

The Germans also fed their prisoners of war on potatoes and it happened that one of them was a French chemist, Parmentier, who, having been captured in 1758, was held a prisoner in Hanover for five years and had to live largely on potatoes. One would have thought he would have acquired a distaste for them but on the contrary when he was released he urged his counrymen to cultivate the potato as a vegetable "that in Times of Necessity can be substituted for Ordinary Food." But the French, even though starving, would not eat potatoes until finally Parmentier persuaded the king and queen to taste some and wear a bouquet of blossoms. The people, seeing that the king and queen were not poisoned, consented to sample them for themselves.

In 1728 an attempt was made to introduce potatoes into Scotland, but they were denounced from the pulpit on two contradictory counts; that they were not mentioned in the Bible and so not fit food for Christians, and that they were the forbidden fruit, the cause of Adam's fall. They were accused of causing leprosy and fever. In England the effort of the Royal Society to promote the cultivation of the potato was suspected of being a conspiracy of capialists to oppress the poor. The labor leader, William Corbett, said, "It has become of late the fashion to extol the virtues of potatoes as it has been to admire the writings of Milton and Shakespeare."

and he declared the workingmen ought not to be induced to live on such cattle food.

When the British army was sent to fight in Flanders—not in 1914 but a hundred years before—they acquired two shocking habits. They learned to swear terribly and they learned to eat potatoes. The monks of Bruges had introduced their cultivation by compelling their tenants to pay part of their dues in potatoes. The farmers, seeing that the monks throve on them, began to save some of the crop for their own use.

In Germany our own Benjamin Thompson, having become Count Rumford in Bavaria, undertook to clean the beggars out of Munich. When he had rounded them up he had to feed them and being a student of dietetics he decided that potato soup was the cheapest and most nutritious food he could find. But he had to smuggle the potatoes into the kitchen secretly, otherwise he would have had a hunger strike in the poorhouse. And so, thanks to the initiative of scientists, kings and monks, and to the involuntary assistance of pigs, prisoners and paupers, the world got the inestimable benefit of potatoes.—*Edwin E. Slosson in Science Service.*

NOTE *and* COMMENT

The Cornelian Cherry.—A correspondent asks for the identity of a small tree which he describes as follows: Small tree or shrub which in about eight years has reached a height of twelve feet, branching from trunk a foot above ground. Bark on trunk and main branches dark and separating about longitudinal gray crevices. Leaves opposite appearing about ten days later than the blossoms. Yellow flowers in umbeliferous heads clustered on very short pedicels at the nodes of the preceding year's twigs. About fifteen tiny florets to the head. Florets four-petaled. Calyx, deciduous in four cup-like segments. At a little distance the shrubby tree could be easily mistaken for a spice-bush. In fact, visitors to whom I appeal for enlightenment so identify it after a cursory glance. After which I lead them up for closer inspection, and point out why it isn't *benzoin aestivale*. Another folk name for spice-bush is wild allspice and in my puzzle a tantalizing coincidence is that the flower heads and calyx cups are very, very much like those of the foreign plant that furnishes the familiar condiment. I should add the tree blossoms at least a fortnight earlier than its neighboring clumps or spice bushes. [The plant described is almost certainly the cornelian cherry (*Cornus mas*) a dogwood native to southern Europe and the Orient. Although seldom seen in cultivation on this side of the world, the shrub is really a desirable addition to our gardens and parks, for its umbels of yellow flowers thickly set along the leafless branches present an attractive sight in early spring when few

other plants are in flower. The red fruits which follow the flowers are about the size of a cherry and are edible, hence the common name of the plant.—*Ed.*]

GLADIOLES.—Referring to the difficulty most people have with the plural of *Gladiolus*, Robert A. Benton writes: People who know little Latin, and their number is increasing every day, have hard work to use the Latin plural *Gladioli* and make a clumsy hybrid word gladioluses instead. Others understand gladiolus to be the plural and change it to gladiolas and make the singular gladiola. All this clumsiness and misunderstanding would come to an end if it were agreed to cut off the Latin ending and make a good English word, gladiol, with its plural gladiols. Such anglicising has been done with many words, why not with this?" [In the case of numerous foreign words, the genius of our language inclines us to make a plural by adding *us* and thus we have convolvuluses, narcissuses and gladioluses. We commonly speak of crocuses instead of croci but the gladiolus fancier endeavors to avoid such forms by speaking of his plants as gladioli. There is, however, good authority for the use of gladiole as suggested by Mr. Benton; indeed, *Lobelia Dortmanna* is often known as the water gladiole. Sticklers for accuracy are fond of repeating that the accent of gladiolus should fall on the second syllable but in gladiole the accent is on the first syllable and therefore nearer to common usage which in spite of frequent correction still holds to gladiol-us. It might be well for those who write of the species of *Gladiolus* to call them gladioles and in time we might avoid the use of gladiolas entirely.—*Ed.*]

IRIS ENSATA.—The little species of *Iris* from the Far East, known as *I. ensata* is not likely to prove attractive to the iris fancier, for its flowers are small purple affairs which suggest these of our common blue flag (*Iris versicolor*). The

valuable feature of this species is found in the leaves which are two feet or more long, about a third of an inch wide, and so strong and at the same time so flexible that they may be used for tying all sorts of garden plants, being fully as satisfactory as raffia in this respect. With a plant or two of this, one grows his own tying material and thus is relieved of the necessity for keeping twine or raffia close at hand.

Red Papoose.—A reader asks whether the name red papoose refers to the red trillium (*Trillium erectum*) or to some other plant. So far as we are aware the only name with papoose in it is papoose-root applied to the blue cohosh (*Caulophyllum thalictroides*). The adjective in the name inquired about, suggests that it must refer to a plant with a red flower or with red juice and may perhaps refer to some trillium, but before we can be certain we need more information about it. *Trillium erectum* bears the name of squawroot and birth-root and might easily become known as papoose-root or red papoose.

Rhubarb Leaves Poisonous.—It is not always safe to assume that because one part of a plant is harmless, all parts are. The elder potato, black nightshade and other common plants are evidence of this. Occasionally we hear of people eating the leaves of the garden rhubarb as a pot-herb, but such use of the leaves is not entirely without danger. The petioles of the rhubarb have been used from time immemorial as material for pies and sauces and although one of the acids in the plant is the deadly oxalic acid, there is no danger in such use, but the blades of the leaf are poisonous and should be avoided. Unless one eats an unusual quantity of cooked leaves, the poisoning is not sufficient to cause death, but the eating of any quantity is likely to produce a violent stomachache and incline the eater to meditate seriously upon his past.

A Freak Erythronium.—While working with a botany class in the field, I found a single flower of the yellow adder's tongue (*Erythronium Americanum*), that has its parts in fours instead of threes. There are not only four sepals, four petals and eight stamens but both the ovary and stigma have four lobes. The size, color and general appearance of the flower are normal. I have never seen this phenomenon reported for this flower though of course it happens often in the case of the trilliums. May I also add a note to the discussion of the popular name for this species? I prefer the name adder's tongue to dog tooth violet. Very recently an acquaintance of mine asked me why the first name is used. When I mentioned the spotted leaves, he pointed out a better reason and one that I have never heard given before. After the flower is fertilized and most of the parts have fallen away, there remains the swollen ovary with the forked yellow stigma and style. Since the flower always nods from the stalk, these remaining parts certainly bear a striking resemblance to a snake's head with out-thrust tongue. This would seem to be an excellent basis for the common name, adder's tongue. I would be interested to learn if there has been any mention of it in previous writings for I can find it nowhere.—*Charles J. Lyon, Dartmouth College, Hanover, N. H.* [The tendency toward four parts is marked in several members of the lily family or their near allies. The genus *Paris* belonging to the Trillium group is always four parted and certain tulips are prone to produce four-parted flowers. The writer once bred up a race of four-parted Darwin tulips all of which possessed this character. Most people assume that the name dog-tooth violet refers to the narrow segments of the perianth, but another and possibly more significant derivation is made from the shape of the bulbs of the European species (*E. dens-canis*). The

bulbs of this latter are very much like the strong holding teeth of the dog and undoubtedly gives rise to the specific name. Violet, it may be observed originally referred to any bright flower hence we have a variety of violets that we no longer call such, as dame's violet, (*Hesperis matronalis*), bog violet (*Pinguicula vulgaris*), false violet (*Dalibarda repens*) and even *Epilobium* which is translated "violet on a pod." —*Ed.*]

Common Names of Heathworts.—Commenting on the plant names in the Ericaceae recently published in this magazine, a correspondent in Washington writes: I note that you say that *Rhododendron maximum* is called "rose-bay." This is very surprising inasmuch as the flowers are never anything more than a shell pink. Rose-bay is generally applied to *Rhododendron catawbiense* that splendid, reddish-purple flowered species which covers so many square miles upon the alpine summits of the highest Appalachians. (cf. Gray's *Manual*, p. 632, which, as far as it goes in common names, is generally right.) In North Carolina however the people never by any chance call *Rhododendron Catawbiense* anything but rhododendron; to them it is not *a* rhododendron, but *the* one and only rhododendron. "Rose-bay" smacks more of the old world, of books, and florists' exchanges; it has not the ring of a name springing from our soil. *Rhododendron maximum* they call "laurel." And who can say they are not right? They are just as much entitled to call it laurel as we are to call *Kalmia* "laurel," for in very truth neither of them are the laurel of the old world, nor anywhere near it. They call *Kalmia* "ivy," and this is quite as sensible as our calling it laurel, though the name calico-bush is also used there and is distinctly preferable because it is specific and endemic and quaintly but quite brilliantly descriptive. *Epigaea repens*, which in New England is gener-

ally believed to be found nowhere else is, it should be remembered, not the Mayflower of the Old World, which is *Crataegus Oxycantha*. Another point to bear in mind is the correct pronunciation of *arbutus*. The son of Ralph Waldo Emerson told me that he was once talking to Asa Gray about this plant and called it *arbu-tus*. "Where's your prosody, man?" cried the old botanist, "not arbu-tus but ar-butus." Hundreds of thousands of people, unfamiliar with the fact that the name comes to us from Latin poetry, the rythm of which admits no changes in accent, are mispronouncing the name of this flower. [There is no accounting for tastes in plant names, and in the article mentioned it was intended to record all the names, no matter whether misnomers or not. It is very desirable, however, to have notes of all kinds bearing on the matter recorded. It is quite likely that under the circumstances "rose bay" is a mere book name, but it *is* a recorded name of the plant. As to arbutus it may be said that the name of a plant is the combination of sounds by which it is indicated. We quite agree with the writer that hundred of thousands of people call the plant arbu-tus. This is its common name and not ar-butus which seems to be used only by the pedantic. It is true that ar-butus is the correct accent for the generic name, but we submit that is not necessarily the accent for the common name. If a common name is that by which a plant is commonly called, then we shall have to stick to arbu-tus.—*Ed.*]

Needle Palm overspecialized.— The needle palm (*Rhapidophyllum hystrix*), a little-known species of Florida is a fine example of the harm overspecialization may work in matters of evolution. This palm as its name indicates, has the leaf-sheaths thickly set with sharp spines which very effectively protect the fruits from the animals that might otherwise eat them and thus distribute the seeds. As a result the

fruits remain on the plant until they decay, or if the seeds sprout their rootlets are unable to reach the soil, so that few new seedlings are produced and the spread of the species into new regions is greatly hindered. Doubtless the palm would have disappeared long ago but for the fact that the underground stem produces a number of offshoots which may become independent plants and so aid in continuing the species in such places as it may happen to have become established. It is quite likely that many other species have disappeared in the past simply because they have become so overspecialized in some respects that they are unable to adjust themselves to changed conditions. It is conceivable that several of our orchids may be on the way to extinction through overspecialized methods of pollination.

THE DASHEEN.—Although the dasheen is a food of great importance in the Orient and was introduced into the southern States for experimental cultivation by plant explorers of the United States Department of Agriculture more than 15 years ago, it has had to fight prejudice and the lack of knowledge concerning its value as a food much as the now popular potato did in Europe at one time. Persistance on the part of certain growers who believed in it, however, coupled with a small demand for the dasheen by certain Oriental people of the larger cities, has developed the production of this new food to a point where an average of 10 carloads are sent to northern markets each season. Now these growers have formed a dasheen association for the purpose of promoting their industry. Experimental work both in the growing of the dasheen and with its eating qualities has proved the potential possibilities of the new crop. The great trouble with the dasheen is that it is, to most tastes, no better than the common potato, which is more easily and probably more cheaply purchased and stored.

Squirrel and Forest.—On many of the western yellow pine forests in the Northwest, the pine squirrel and the second-growth pine may be said to be engaged in a struggle to the death, with the squirrel holding a conspicuous advantage according to latest reports, says the Forest Service, United States Department of Agriculture. The squirrel's advantage is due to the fact that, somewhat like the early bird, he is busily collecting the seed before it has a chance to "dig itself in" and develop into a pine seedling. In examining some 15-year-old cuttings in Montana, the Priest River Forest Experiment Station found that practically no new growth has come in. Cones are plentiful on the two or three seed trees an acre left for seeding new growth and show sufficient seed to start up at least an open stand in 15 or 20 years against all other enemies of young trees; but there is evidence that the pine squirrel is determining otherwise, and that possibly nothing short of planting such areas with seedlings will circumvent the sharp eyes and insatiable appetite of this small foe.

European Corn Borer.—Probably the most destructive of all the pests that prey on maize or Indian corn is the European corn borer. This is a small worm-like creature about an inch long which turns into a yellow-brown moth. The damage to corn is done in the larval stage of the insect, the "worm" burrowing into all parts of the stalk and ear and even eating the tassels and leaves. Forty-two larvae have been taken from a single ear of corn. But this is not half the animal's misdeeds. In the absence of corn it will feed on nearly every garden crop with the exception of the leguines. It prefers celery, potatoes, cotton, rhubarb, dahlias, sunflowers and gladiolus, but scarcely a food-plant is immune. It appeared in this country in the vicinity of Boston about 1917 and has since spread to central Ohio. It is practically

certain that it will penetrate to all parts of the United States where corn is grown. Each female lays more than 300 eggs and in the warmer regions the insect is double brooded, so that there is sure to be enough of the insects to go around. There is no known means of checking its spread, though cleaning up the refuse in the field in which it spends the winter may be depended on to retard it somewhat. In anticipation of the appearance of the insect in Illinois, the State is breeding a parasite from Europe that feeds on the borer. We have a native borer living in the wild smartweeds that, quite against its will is acting as host to the parasite until the dreaded pest arrives. It is interesting to note that the insect is supposed to have reached America in a shipment of broom corn imported from Italy or Hungary. Thus easily do the noxious insects elude the Federal Horticultural Board while its attention is riveted upon rules for hampering the importataion of flowering plants from other parts of the world.

Grass Nut.—Texas has many beautiful wild flowers, but none more lovely than those of *Calydorea Texana*. The common or local name for this flower is grass nut, its bulb being solid and edible, having a flavor similar to that of a raw sweet potato. I shudder to think how many of these rare blossoms I destroyed when a child by eating the bulbs. The plant has slender, deeply grooved, grass-like foliage and grows six to eight inches in height. The flower measures about two inches in diameter, is six-petalled, spreading, and a pure, glistening, sky-blue in color. Each flower lasts but a day but each bulb produces several blooms. The stigma is minutely three-cleft and the filaments smooth. Its favorite soil appears to be a grassy, sunny and rocky one. It is found most frequnetly in the cinders and gumbo of the railroad beds, where its delicate, silken flowers seem most out of place. A year ago I dug some of the bulbs to plant in my

flower beds. I found the bulb quite deep, and in many instances, what appeared to be the brown husks of one or two bulbs on the stem of the plant below ground, as though it had discarded the old bulb, and going down, produced a new one. The bulb is rather small and a dark brow or brownish black. It is easily transplanted and naturalized.—*Florence Hartman Townsend, Rockwall, Texas.* [Some of these bulbs sent from Texas, survived the recent trying winter out of doors, and in late June put up a number of their handsome flowers. The species belongs to the Iris family and in flower and foliage suggests the nearly related blue eyed grasses (*Sisyrinchium*). Though the flowers are both beautiful and interesting, their short life presents their ever becoming garden favorites.—*Ed.*]

Sweet Pea Tubers.—Though the kindness of Harry G. Wolfgang, Leetonia, Ohio, we have received specimens of the rare *Lathyrus tuberosus*, a relative of the common sweet pea (*Lathyrus odoratus*) and the everlasting pea (*L. latifolius*), which bears numerous tubers two or three inches long and an inch or more thick. The tubers appear to be half root and half stem. Under the microscope a section shows the cells to be full of roundish starch grains somewhat smaller than those of the common potato. *Lathyrus tuberosus* grows wild in the northern parts of the Old World and appears to be perfectly hardy in the vicinity of Chicago. The flowers are said to be red, somewhat smaller than those of the sweet pea and not so abundantly produced.

EDITORIAL

What is the most interesting wildflower in your region and why is it interesting? We would like a series of short articles on this subject from our readers. Probably when one thinks of it, there is no single flower that is "the most interesting" but each of several have points that raise them above the general vegetation in the appreciation of the student. Often it is sheer purity and intensity of color, again it is delicacy of outline or perhaps the merely fortuitous circumstance of blooming at an opportune time or in appropriate floral company. Still others may be mentally associated with some unusually memorable occasion or call to mind the picturesque habitat in which they grow. In any event, we believe notes of this kind are worth making and we invite contributions. The old question of "What is your favorite flower?" may assume a new significance if one tries to analyze the reasons for his preference.

* * *

Another spring has come and gone and with it the flower-gatherer, and that misguided individual the anti-flower-gatherer who would make us good by law. The average individual who inveighs against the picking of the wildflowers is in about the same position as the lady who lectures the small boy for killing birds the while she is wearing a hat trimmed with bird-skins. For it cannot be denied that we are a nation of flower-gatherers and few are entirely guiltless. To be sure we gather them in our own gardens for the most part, or the florist gathers them in his and sells them to us at a good stiff price on Mother's day and other festive oc-

casions, but there are those who have neither flower gardens nor money with which to satisfy the florist though they may have a high appreciation of floral beauty. There does not seem, however, to be any essential difference between flower-gathering in the garden and the same practice in wood and meadow, far removed from city and town, except that in the latter case the plants grow wild and would eventually be devoured by the unappreciative cow or plowed under by the equally unappreciative agriculturist. That the showy violet blossoms rarely produce seeds is well known, but for one to gather a nosegay of violets in a country lane makes him a floral bootlegger in the eyes of the ever-increasing army of "thou-shalt-nots". We belive that there should be stringent laws protecting the land owner in the possession of his flowers, if he desires protection, but we also believe that there is nothing particularly sacred about the flowers growing in wild lands whose owners care nothing about them; in short that there is nothing wicked in flower-gathering itself, though taking flowers valued by the owner may well be. It cannot be denied that a vast number of showy flowers are by necessity destroyed each year. When we wish to produce food or found a town their room is better than their company and out they go. But nobody raises a protesting voice when the supervisors decide to tidy up the country roadsides or the railroads mow down acres of loveliness along the right of way, although much of this is unecessary. The people most active in preventing all flower-gathering, usually fail to see that those who love the flowers rarely gather them in quantity. A new and more effective way of protecting the wild-flowers would be to spread a wider appreciation of their beauty afield, but it must be confessed this would remove some of the spectacular effects of flower-protection and in-

ject common sense into what is now too often a matter of sentiment.

BOOKS AND WRITERS

"American Plant Names" is being mailed to advance subscribers of the work. * * * Now one may find amusement in discovering which of the 63 lilies, 66 oaks, 61 violets or 68 thistles his region contains. * * * There are ten thousand names distributed among about seventeen hundred species. * * * Even the most unassuming plant may fall heir to several. * * * There are 63 plants named for the Indian and 71 others connected with the rattlesnake or snakes in general. * * * And the list actually contains a blue dandelion! * * * But all the names are now anchored to the correct technical terms and that's that! * * * The book is not a reprint of "Plant Names and their Meanings" as some seem to think.* * * We hear that James P. Berry has issued "North American Woodlot Trees". * * * The Wiley's also announce as ready "American Forage Plants" by Arthur W. Sampson and promise a "Textbook in General Botany" by Holman and Robbins in August. * * * A little 93-page book by J. B. S. Haldane of Cambridge University will likely interest philosophical readers. * * * Its title is "Daedalus" and it deals with the science of the future. * * * If all comes to pass that could come to pass, this world is in for some remarkable transformations. * * * E. P. Dutton is the publisher. * * * Col. W. B. Thompson is about to start a new arboretum for desert plants in the vicinity of Phoenix, Arizona. * * * Looks as if we would soon have first-hand information on the fine points of the cacti!

The appearance of a laboratory Manual in botany by Transeau and Sampson revives interest in the senior author's text in "General Botany" first issued in 1923. This latter book is an introductory course designed for use in colleges and the more advanced secondary schools. That it is intended to cover the entire field may be inferred when it is known that it contains fifty chapters and runs to more than 550 pages. As is usual in books of this kind the early chapters are concerned with the anatomy and physiology of vascular plants with later ones on the lower forms of life, evolution, classification, and kindred matters. The work has a strong ecological trend as might be expected of an author of Dr. Transeau's predilections, but this trend is in accordance with modern ideas. The work has a vast amount of information not ordinarily found in the text-books though this comprehensiveness may at times prove a stumbling-block to the beginner who often finds it difficult to distinguish the essentials from less important facts. There are more than 350 illustrations many of which feature ecological conditions that are still somewhat unfamiliar to the student. In the opinion of the reviewer, the Manual fails to equal the text in value. There are too many experiments "to show" various things, rather than to discover the facts. It must be admitted, however, that the exercises cover a wide range of phenomena and that anybody who works through them all will be well grounded in the essentials of the subject. Although designed to accompany the Transeau text the Manual may be used separately if desired, since it is concerned with the things that all beginners need to know. The price of the text-book is $4.00 and that of the Manual $1.20. Both are published by the World Book Company, Yonkers, N. Y., the text forming one of the volumes in the "New World Science Series."

George C. Thomas, Jr. has issued a most complete and useful book on rose-growing under the title of "Roses for all American Climates." This is not the author's first book on the rose but in spite of his familiarity with the subject, he has quoted extensively from other authorities. The roses are among the plants most profoundly influenced by climatic conditions and the book begins appropriately with chapters on the subject. For his purpose the author divides the country into six zones and for each of these he gives lists of roses that are best suited to them. Then comes descriptions of an immense number of varieties with their time of blooming indicated and other matters of interest added. With this are included comments by a large number of other rosarians from which one may gain much information as to the hardiness of the varieties, the length of the blooming season, etc. The book ends with chapters on the propagation, planting, and general care of roses. There are 24 plates in color. The book impresses the reviewer as an extremely practical volume which all rose-fanciers will be glad to possess. It is published by the Macmillan Company, New York, and the price is $3.

"Elements of Plant Biology" by A. G. Tansley, Lecturer in Biology at Cambridge University is a sort of special purpose book designed for the use of young medical students in the first half of a year devoted to biology. It forms an introduction to the biology of plants and is expected to be followed by work in zoology. The author observes in his preface that his classes range from 120 to 250 students and that the book has been designed to get results without special attention being given to pedagogic methods. Nearly all the work called for is with the simple plants probably a wise course when students are more interested in function than anatomy. Following each chapter are directions for experi-

ments which render the use of a separate laboratory manual unnecessary. The work begins with a discussion of protoplasm and the cell, food-making, colorless plants, the origin of sex, etc. and this is followed by chapters devoted to roots, stems, leaves, flowers, and the like in the usual sequence. The author makes a distinction between the food of the plant as a whole, which he regards as carbon dioxide and water, and the food of protoplasm which he agrees consists of starches, and sugars. The book will scarcely be suitable for class-work on this side of the world but it cannot fail to be of interest to all teachers of the subject for its clear presentation of the facts. It is published in America by Dodd, Mead & Company, New York, and costs $4.00.

Five years ago, John Merle Coulter and Merle C. Coulter, father and son, brought out a small book on "Plant Genetics" with a view of making the information on this subject available to beginning students. Genetics, however, is a young and vigorously growing subject and new facts are coming to light almost daily. For this reason books on the subject are out of print almost as soon as issued and a reissue of the Coulter book has already become desirable. The new issue has recently appeared from the Chicago University Press. It has acquired a new title "Outline of Genetics; with special reference to Plant Material" and bears the name of Merle C. Coulter as sole author. As to the general subject it may be said that the outstanding features of genetics are now fairly well recognized and the task of subsequent workers will consist largely in rounding out the subject by investigation of such lesser problems as invariably come up in new studies. The new volume, therefore, is very much like the old one, except that it has been brought up to date by the addition of pertinent material. Like its predecessor, it presents the facts in intelligible lan-

guage and is well illustrated by diagrams and charts. Here the beginner will find explained such matters as Mendel's law, mutation, linkage, bud variation, sex determination, the inheritance of acquired characteristics and many related matters. The limiting of the subject to a consideration of plant genetics is to be commended since the problems presented are rather more easily explained by instances taken from the plant world than from the world of animals. All students of plant and animal breeding cannot fail to find the book of absorbing interest. Its price is $1.50.

Bonfires no longer blaze upon the hills as the sun reaches its solstitial splendor; the worship of Baal has passed; and in a Protestant country the feast of St. John awakens little emotion. But religious faith of whatever nature has a persistent vitality; there are superstitious fibers enwrought in every soul; and as long as St. John's-wort gilds the roadsides and pastures with its pale gold—far away reflections of the long extinct fires of the Vigil of St. John—so long will flourish the curious beliefs clustering about the plant blessed by the Baptist and preserving memories of still older festivals of the midsummer.—Martha B. Flint.

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PERENNIAL FOUR-O'CLOCKS.

THE AMERICAN BOTANIST

VOL. XXX. OCTOBER, 1924. No. 4

When fades the cardinal flower, whose red heart bloom
Glows like a living coal upon the green
Of the midsummer meadows, then how bright,
How deepening bright, like mounting flame doth burn,
The golden-rod upon a thousand hills!
Richard Watson Gilder.

PERENNIAL FOUR O'CLOCKS

By Willard N. Clute

IN their native haunts, the common garden four-o'clocks are perennial but when grown in more northern latitudes they commonly die under the rigors of winter. A great many people probably do not know that this plant may be made perennial in cool regions by digging up the roots in autumn and treating them like dahlias.

The illustration on the opposite page shows a single perennial plant of this kind. It is now ten years old and exhibits no sign of senility; in fact, it seems to grow stronger with age. This season it will produce approximately ten thousand blossoms.

The plant has had a varied existence. One year it was overlooked entirely and did not get back into the soil for eighteen months, so that while the plant is ten years old it has seen only nine summers. This is the specimen mentioned in this magazine some time ago which illustrates amphichromy, producing both white and red flowers on the

same branch and even in the same flower clusters. An examination of the picture will show a number of these red flowers which, owing to their color, do not come out as clearly as the others.

During the cold and wet summer, just passed, the flowers have belied the name of four-o'clocks by remaining open most of the day. They were rarely closed except in full sunshine.

MEETING SUMMER ACROSS THE PRAIRIE

By O. A. Stevens

THE writer left Fargo, North Dakota, on June 17, 1924, traveling entirely in daylight by train as nearly southward as possible, passing through Willmar (Minnesota), Sioux City (Iowa), Fremont, Lincoln and Beatrice (Nebraska), to Blue Rapids, Kansas. The month of May had been unusually cold and the vegetation slow in developing. Leaving Fargo the fields of spring grain were but a few inches high, some well covered with the yellow flowers of mustard (*Brassica arvensis*) which was just coming into blossom. In others, especially in low places the white flowers of Frenchweed (*Thlaspi arvense*) were abundant.

On the prairie the Kentucky bluegrass which is common in the remaining strips of natural grass, was well headed, probably about in full blossom. The tall flowering stems of porcupine grass (*Stipa spartea*) were appearing, and gray tones were added by the low leafy stems of *Psoralea argophyll* and *Artemisia gnaphalodes*. Looking back from the rear of the train, long patches of spiderwort (*Tradescantia bracteata*) colored the side of the grade. Here or on the

prairie was also an abundance of the yellow heads of groundsel (*Senecio plattensis*). The tall wand-like racemes of tansy mustard (*Sophia intermedia*) waved in the wind beside the track or in the fields. Still more slender, rose the stems of the figwort (*Scrophularia leporella*), small patches of which appeared at frequent intervals, just coming to flowering. Patches of the beautiful white flowers of the Canada anemone (*Anemone canadensis*) which here had just come into full flowering were common especially in the lower ground. They remained common to Fremont, Nebraska, after which none were seen. The writer recalls only one or two places where he had found them near Manhattan, Kansas, in earlier years.

Most of the way was across level or gently rolling prairie. On somewhat lower prairie before traveling far in Minnesota the groundsel was replaced by other yellows—star grass (*Hypoxis hirsuta*) dotting the ground, and hawksbeard (*Crepis runcinata*), resembling the groundsel but with fewer heads on more slender stems. The white flowers of camas (*Zygadenus elegans*) were just appearing on their tall slender stalks.

A decided change of scenery came at Granite Falls in crossing the valley of the Minnesota River. Here were seen outcroppings of the quartzite and in places the valley looked as if some giant steam shovel in ages past had dropped masses of it here and there. Actually these are projections unconquered by the glacier, the intervening spaces being covered with soil. The flowers of yellow sweet clover (*Melilotus officinalis*) were first observed here. In places the beautiful pink beardtongue (*Pentstemon grandiflorus*) was seen. On the barren rocky hillsides were the small white beardtongue (*P. albidus*) and the small primrose (*Meriolix*

serrulata) which departs from the habit if its congeners in displaying its yellow blossoms in the bright sunshine.

Leaving the river valley the way was again across the rolling prairie. Occasionally on the more abrupt and rocky slopes were patches purple with flowers of loco (*Oxytropis lamertii*) or pale yellow with the low insignificant painted cup (*Castilleia sessiliflora*) which represents its genus on the plains. On the prairie at intervals appeared the delicate purple plumes of the torch flower (*Sieversia ciliata*).

By the time Pipestone, Minnesota, was reached it was evident that the mustard was more advanced. At Fargo the plants had been low, the first flowers topping a dense mass of buds on yet undeveloped stems, but here the stems had stretched upward for perhaps a foot. The prairie grasses and their accompanying *Psoralea* and *Artemisia* also had grown taller. Fleabane (*Erigeron philadelphicus*) was in flower in low meadows and the pale green leaves of the deadly water hemlock (*Cicuta maculata*) were noted in some places. Near Garretson flowers were seen for the first time on the alsike and red clovers, the earlier flowering white clover being a prominent part of the pastures over most of the journey although not so common northward. The pink flowered *Phlox pilosa* appeared in the meadows and was thereafter one of the conspicuous flowers.

A days stop was made at Sioux Falls. There the woodland roses (*Rosa blanda*) which are slightly earlier than the prairie ones, were in bloom. Flowers were noted on alfalfa and on prairie larkspur (*Delphinium penardi*) and the leaves of the Compass-plant (*Silphium laciniatum*) were seen for the first time. The falls of the river and its older bed are a very interesting sight. When it had cut down to the solid quartzite it wandered over considerable territory seeking its way downward. On this occasion it seemed remark-

able what a wealth of vegetation was growing in the thin layer of soil on the older exposures. Probably the rock beneath assists in sub-irrigation whenever surface water is available, and this was a rainy period.

Central Nebraska seemed to be the region where there was a distinct change in the landscape. At Lincoln the catalpa trees (*Catalpa speciosa*) were in full bloom. A small one at Fargo had just begun to expand its leaf buds (flowers on it opened July 9). Leaving Lincoln, *Cornus alternifolia* in flower became a conspicuous part of the landscape, replacing our *Viburnum* of the north. *Psoralea floribunda* was prominent on the prairie. The tall spiderwort (*Tradescantia reflexa*) displayed handsome masses of its blue flowers in places along the roadside. The flowers of elderberry (*Sambucus canadensis*) were beginning to appear and the bushes were in full flower in northern Kansas. Other plants were distinctly advanced, the panicles of bluegrass (*Poa pratensis*) ripened, and the first pods of the early cruifers (*Thlaspi, Lepidium, Sophia*) falling.

At Beatrice, Nebraska, the first sunflower head was seen but it was yet early for them. A low evening primrose with inconspicuous flowers (*Oenothera laciniata*) and the clumps of *Silphium integrifolium* not yet in flower were noted for the first time. At Marysville, Kansas, the first flowers of Mullein (*Verbascum thapsus*) appeared, and the spear-like fruits of porcupine grass (*Stipa spartea*) were mature or nearly so.

The journey afforded an interesting confirmation of the difference in flowering period of the two sweet clovers. The flowers of *Melilotus officinalis* were observed at Granite Falls, Minnesota, and were abundant thereafter. A single plant of *M. alba* in blossom was seen along the track at Garretson, Minnesota, but scarcely any others until Lincoln

was reached and at Blue Rapids, Kansas, it was not yet in full flower. I have recorded (Am. Mid. Nat., 5:102; 7:91) a difference of 16 days at Blue Rapids and 12 at Fargo in the appearance of the first flowers of the two species.

As had been noted on previous trips, the condition of the maize in the fields changed but little for some distance. The unusually cool wet weather which had prevailed probably acentuated this condition. At the start it was but four to six inches high and just being cultivated for the first time. Beyond Lincoln, however, it was distinctly larger and a foot or more high in northern Kansas. I believe it was somewhere in Nebraska that we first saw the practice of "listing" (planting in furrows), which is the usual one in southern Nebraska and in Kansas.

The first field of winter wheat was noted beyond Sioux City soon after passing into Nebraska, and it became common around Fremont. At Blue Rapids a few fields were just beginning to show signs of ripening, and harvesting began about July 1. At Akron, Iowa, the first crop of alfalfa hay was being cut; in northern Kansas this was finished in nearly all of the fields, even those where it had been delayed by the rains. We arrived just in time for the first picking of garden peas (June 20) and returned to Fargo to find them on the same variety July 10.

PLANT NAMES AND THEIR MEANINGS—XXI
ORCHIDACEAE

By Willard N. Clute

BRANCHING off from the dicots at some point near the buttercup or water-lily alliance, the great group of plants known as the monocotyledons has arisen and progressed steadily upward from such lowly species as the grasses and sedges to its culmination in the Orchidaceae, the highest and most specialized group of plants in the world. This renowned family possesses many traits in common with the asters and thistles which stand highest in rank among the dicotyledons. All have inferior ovaries, united petals, a single whorl of stamens, and zygomorphic flowers. There are few in either group with inconspicuous inflorescences, but while the asters and their kind have depended upon small flowers in close clusters, made noticeable by enlarged and colored ray-flowers, the orchids have fewer and much larger flowers and these so specialized and splendid that they are at once the objects of admiration by the general public and the source of much interest to the scientist.

The titular genus of the Orchidaceae is *Orchis*, once of more extended dimensions but which in our region now includes only two somewhat inconspicuous species. In being somewhat retiring they resemble the generic name which is a very ancient one arising out of the mists of antiquity and belonging to that class of names whose derivation Dr. Gray used to observe, is "recondite."

It is natural that flowers as beautiful as those of the Orchidaceae and found for the most part here and there in remote swamps and dark woodlands, should be in many in-

stances associated with the nymph and goddesses with which the primitive imagination peopled such places. *Calypso* and *Arethusa,* therefore, one a goddess and the other a nymph, if there is any difference, are remembred by the botanist, if not by the religiously minded, by two handsome species from the boggy wastes. The genus *Scrapias* is also named for a deity, but this time it is one of the Egyptian gods.

The genus *Cypripedium* comes from two Greek words *Kypris* an ancient name for Venus and *pedilon* meaning shoe. Owing to the form of the second word, some writers would spell the genus *Cypripedilum.* The name, of course, refers to the inflated petal forming the lower lip of the flower, in which some have fancied a resemblance to the sock or buskin of ancient days.

Serveal other generic names in this family have been given for some salient feature in the flower or its parts. Among them is *Habenaria* the generic name of the fringed orchises which is derived from *haberna* meaning a thong or rein and referring either to the shape of the lip or spur in the original species. *Microstylis* is simply "small style" and *Aplectrum,* by which the putty-root is known, means "without a spur," this being a distinction of some consequence in a family which is almost invariably spurred. *Corallorrhiza* signifies coral-root and *Tipularia* was given in allusion to a fancied resemblance between the blossoms and the crane-fly (*Tipula*). *Hexalectris,* according to Gray, comes from two Greek words meaning six and a cock, but Britton says it means six-crested. In any event it refers to the crested lip of the original species. *Malaxis,* an obscure name for an obscure species (it is found in only one place in America) seems to refer to the tender nature of the plant and means "a softening." *Liparis* means fat or shining in allusion to the smooth leaves.

The fringed lower lip of certain species have suggested the generic name *Pogonia* meaning "bearded," while *Calopogon*, the name of an allied genus means beautiful beard. The name *Limodorum* which is sometimes applied to the latter genus means merely "meadow gift." The slender spikes of small white flowers, spirally arranged, to be met with in fields and thickets throughout the summer and autumn have secured for the plants the name of *Spiranthes* which signifies "flowers in spirals." It is from two Greek words meaning "a coil or curl" and "flower." Wood translates this as "a wreath." This genus is sometimes known as *Gyrostachys* which has essentially the same meaning being fairly translated as twisted spike.

Only two of our North American orchid genera commemorate the names of botanists, and even one of these has recently been discarded. *Listera*, however, still recalls a certain Martin Lister, an English botanist of the sixteenth century. Until recently, John Goodyer was remembered by *Goodyera* applied to the rattlesnake plantains but this is now superseded by *Epipactis* a Greek word with no significance in the Orchidaceae since it is properly the ancient names of the helleborine, one of the Ranunculaceae. The orchids once placed in *Epipactis* are now in the genus *Serapias*. Thus does the juggler with names trifle with well established terms.

When it comes to the common names it may be observed that there is a vast difference between words so nearly alike as orchis and orchid. As a matter of fact, any of the more than five thousand species of the Orchidaceae may be called and orchid, but only those belonging to the genera *Orchis* and *Habenaria* are regarded as orchises. *Orchis spectabilis* is found in wet places in a spring and therefore comes honestly by its name of "spring orchis." It is probably owing to its specific name that it is known as "showy orchis" while

its bright color makes it "gay orchis." Baldwin's "Orchids of New England reports that it is called "preacher-in-the-pupit" in the Middle States, in allusion to the erect flower-spike between the two leaves. The "small round-leaved orchis" (*O. rotundifolia*) is known as "heal-all" and has some reputation, possibly undeserved, in the domestic materia medica. The names of "shinplasters" and "shin-leaf" are doubtless mere matters of fancy since the plant in any case has no efficacy in healing broken shins.

A number of species in the *Habenaria* genus are called "fringed orchises" because the lip is cut into narrow segments. The most common of these are the two "purple fringed" species (*Habenaria fimbriata* and *H. psycodes*), distinguished as the "large-" and "-small-" fringed orchisea respectively. *Habenaria psycodes* is also the "pink-fringed orchis," the "flaming orchis" and "soldier's plume," while *H. fimbriata* is the "tattered fringed orchis" and "meadow pink." To call this species "long purples" and "dead man's fingers" is simply to drag over from the foxglove two names by which one of Shakespeare's characters refers to it in "Hamlet." The "green fringed orchis" is *H. lacera* and the specific name accounts for the name of "ragged orchis." It is very evident that the line dividing the ragged from the fringed is an extremely narrow one in this genus. Two magnificent species are the "white fringed orchis" (*H. blephariglottis*) and the "yellow fringed orchis" (*H. ciliaris*). The latter is called "rattlesnake's master" which means nothing because it does not grow where snakes abound and is not a cure for their bites. Another white-flowered *Habenaria* of the West is *H. leucophaea* called the "white-flowered prairie orchis." The "bracted green orchis" or "long bracted orchis" is *H. bracteata* while a second green species is *H. clavellata*, otherwise known as "green wood orchis," and

"three-toothed orchis." The first mentioned is also called "vegetable satyr" but for what reason I know not.

The "yellow orchis" is *H. flava,* but one may get an idea of just how yellow it is from its other common names, especially "green rein orchis," "small pale green orchis" and "greenish orchis." It is known as "tuberculed orchis" because of small projections on the corolla. There remains yet to be mentioned among the Habenarias, the "bear's ears" or "great green orchis" (*H. orbiculata*) a species that looks like a large edition of *Orchis rotundifolia* with which it was once classed. This, too, is called "shinplaster" and "shin leaf" as well as "heal-all," in fact the two species are seldom distinguished apart by country folk and naturally bear the same names. It is also called "round-leaved orchis" and "large two-leaved orchis." "Bear's ears" refers to the two broad, flat leaves pressed close to the ground, but these do not resemble the ears of any bear that I have seen. The name of "gall-of-the-earth" applied to our plant seems to hint of medicinal qualities. In the early days a medicine to be impressive was necessarily bitter and was regarded as curative in direct proportion to its bitterness. It is doubtful, however, if this species is of any value in medicine.

The majority of the orchids are rare and retiring. Their means for cross pollination are often most complex and in some cases so much over-specialized as to defeat the end for which they were developed thus contributing to diminishing their numbers instead of increasing them. Since the plants are incapable of pollinating themselves the absence of a certain insect may result in the disappearance of the whole race from a neighborhood. A few with small flowers are reported to be occasionally pollinated by mosquitos but this is no justification for sparing these insects. Among the insignificant species may be mentioned the "tway-blades"

—species of *Listera* and *Liparis*. These are so-called for the twin leaves or twa (two) blades. Our only species of *Liparis* is *liliifolia* known as the "large tway-blade." *Listera convallarioides* is the "broad-leaved tway-blade." *Listera cordata* varies this nomenclature by "double-leaf" and "twin-foil" while *L. loeselii* is the "fen orchis."

The moist shades amidst which the orchids so frequently grow, have indissolubly connected them in the mind of the public wtih the idea of snakes, though with the exception of a few water snakes most animals of this kind seem to prefer dry and open places. However, *Microstylis monophyllos* is the "adder's mouth" or "white adder's mouth" while *Pogonia ophioglossoides* is the "adder's-mouth pogonia," and "snake-mouth," while its specific name indicates that it is the "snake-tongue" as well. Its most attractive title is "rose pogonia." The "whorled snake-mouth" is *Pogonia verticillata*. This unobtrusive plant, whose leaves in a circle at the top of the stem simulates the Indian cucumber root (*Medeola*), is more commonly known as "whorled pogonia," while the "small whorled pogonia" is *P. affinis*, and the "nodding pogonia" *P. trianthophora*. This latter is also called "three birds" but it requires a lively imagination to see any resemblance to birds in the small pale rose-colored flowers; nor for that matter can anybody discern much of a resemblance to a serpent's mouth in any of the forms that allude to it.

Arethusa bulbosa, larger and handsomer than the other species mentioned in connection with reptiles, is the "dragon's mouth." It is also called "wild pink" but "arethusa" is still its commonest common name. The showy *Calopogon pulchellus* is "swamp pink" and "grass pink," the latter being most frequently used. The books occasionally call it "meadow gift" but this is merely a translation of the generic name *Limodorum* under which it is sometimes listed. The

"dragon's claw," or "turkey claw" is *Corallorrhiza odontorhiza* and the "dragon's claws" is *C. maculata*. The first is the "small coral-root" and the second naturally the "large coral-root." It is likely that the idea of claws associated with these plants is due to the knotted and scaly appearance of the rootstock. *Corallorrhiza odontorhiza* is the "late coral-root" and *C. trifida* is of course the "early" one. "Crawley-root," applied to *C. odontorhiza* is likely a mispronuciation of coral-root.

Hexalectris aphylla is the "crested coral-root" and *Serapias helleborine* is the "false helleborine," the true one, as we have indicated, being a species of the Ranunculaceae. Our species recently rejoiced in the name of *Epipactis helleborine*, but the generic name has now been adopted for the curious little specimens known as rattlesnake plantains. *Epipactis pubescens*, as one of the representative specimens is now called, is still another witness to the association of harmless plants with poisonous serpents. In this case there is slightly more reason for the name for the leaves are finely reticulated with white which might be held to simulate scales. Besides "downy rattlesnake plantain" the plant is known as "rattlesnake weed," "rattlesnake leaf" and "adder's violet." The names of "net-leaf" and "spotted plantain" are self-explanatory. "Scrophula weed" alludes to reputed medicinal properties but "rat's bane" seems to be a manufactured name if not, perhaps, a careless rendering of "rattlesnake plantain." *Epipactis repens* is the "lesser rattlesnake plantain," "white plantain" and "squirrel's ear," all of which are suggested by the leaves. The derivation of "creeping-root plant" is obvious.

Owing to the resemblance of its blossoms to the crane-fly, *Tipularia dicolor* is called "crane-fly orchis." It is also known as "tallow-root" from the nature of the underground

stem. The putty-root" is *Aplectrum hyemale* because the sticky matter in its tubers has been used for mending crockery. There are two of these tubers to each plant which lends especial significance to the name of "Adam and Eve."

Though the species of *Spiranthes* are universally known as "ladies' tresses" this name, it appears on good authority, should be really "ladies' *traces*" and refer not to milady's ringlets or shingled poll, but to those strong cords wherewith she is wont to constrict and confine her body. Nor do these names refer to the Virgin for in that case the name would have been written "Lady's tresses." However we pronounce the word, *Spiranthes cernuum* is the "nodding ladies' tresses" and *S. gracillis* is the "slender ladies' tresses," the slender referring to the flower and not to the lady. The last named species is appropriately called "twisted-stalk" and "corkscrew plant" and this becomes "screw-augur" for the first species which is also called "wild tuberose" with no obvious application.

The genus *Cypripedium* ends the list of orchid genera in North Eastern America. The word itself means "Venus'-shoe" but we of the Western world, obliged to take our mythology second-hand as it were, commonly refer to the species as "moccasin-flowers." Europeans generally call the plants "Lady's slippers" or some equivalent as the French *Soulier de Notre Dame* and *Sabot de la Vierge*. It seems that when the heathen world was converted to Christianity there was a general movement to change the names of plants honoring heathen deities to others more in harmony with the new religion and consequently "Venus' shoe" became "Our Lady's slipper." But the generic name was never converted and still stands as "Venus' shoe" in spite of the common names under it. *Cypripedium pubescens* is the "large yellow Lady's slipper" while *C. parvulum* is the "small" one. There is

some evidence to show that these two so-called species are really two forms of the same thing and the specific names, like the common ones, a mere matter of size. *Cypripedium candidum* is the "small white Lady's slipper" and also "ducks," the latter possibly suggested by the shape of the saccate lip. The "ram's head" or "ram's head Lady' slipper" (*C. arietinum*) is another species that derives its name from a fancied resemblance in the flower. This species is known as "American valerian" but the species best entitled to the name is *C. parvulum* which really has medicinal properties though not of a high order, in fact the whole group is sometimes called the "nervine family" and *C. hirsutum* is occasionally called "nerve-root." *Cypripedium parvulum* is the "yellow-" or "downy yellow Lady's slipper," "yellow moccasin flower," "whip-poor-will's shoes," "slipper root," Indian shoe," "ducks" and "Noah's ark," all ringing the changes on the shape of the lower lip. *Cypripedium hirsutum* is also known as "whip-poor-will's shoe," "moccasin-flower," and "ducks" but the "stemless Lady's slipper" (*C. acaule*) covers most of the ground we have already traversed being "pink moccasin flower," "pink lady slipper," "Indian moccasin" and "Noah's ark," and in additional "camel's foot," "old goose" (instead of duck), "purple cypripedium" and "squirrel's shoes." It has been called "pitcher-plant" also, but this is doubtless due to sheer ignorance.

FAVORITE FLOWERS

THE editor of the *American Botanist* challenges his readers to name their favorite wildflowers and give the reasons why. I shall confine myself to those that grow in western Nebraska though I lived for thirty-seven years in New England and loved many wildflowers.

I am quite sure that I, in common with others, care more for the first flowers of spring than for most of those that fill the growing season. I am sure, for instance, that trailing arbutus would not attract very much attention if it came in midsummer. So I find the flowers I want to write about are the first that bloom in this region and excite our imagination by coming out of the cold ground as if by miracle. On April 6, 1889, I gathered *Townsendia sericea* at Valentine, Nebraska and analyzed it correctly—my first attempt at systematic botany. Of course I was "tickled to death" to get it right. I had been observing the bud; sessile, like a button sewed on too tightly, and when I returned from a five-day missionary trip, I found it with its pale pink petals in bloom. "A daisy" I exclaimed. The leaves form a rosette and the buds sit close—the whole plant not over an inch high, on dry hillsides of sand or magnesia, both in thin woods and on the open prairie. If you pick them for the home, they have to go into a saucer of wet sand. Compared with many of the later flowers they are commonplace, but coming when they do they strike right to the heart.

Immediately following these come *Pulsatilla hirsutissima*, the Western representative of the wind-flower, *Anemone nemorosa,* which we do not have. Our Western flower has been called an anemone but not by later authors,

I called it a tulip when I first looked upon it in 1889. It opens up like the tulip, forming a purple cup with sepals and petals an inch and a half wide. The leaves when they come later are hirsute. The seeds have long silky hairs to help them to unoccupied ground.—*J. M. Bates, Red Cloud, Nebr.*

In a region like the great State of New York, remarkable for the variety and profusion of its vegetation, rich beyond all dreaming in both flowering and non-flowering plants, a paradise for the botanist, it would be most difficult to select the one that arouses the greatest or most abiding interest. So, instead of trying to make such a selection, I shall take at random a plant that always excites my admiration, because here, it is the first to thrust its brave hope up through the snow and make green the waterways and swampy places, thereby expressing its faith and unwavering trust in the coming of spring. Then, too, I am always filled with wonder at the marvelous beauty of its compact coil of green and its ruddy, shell-like, many-colored spathe inclosing the stout spadix close-set with perfect, lavender-colored flowers. There is such a blending of many colors as to give the whole a peculiar charm.—I write of the skunk cabbage, (*Symplocarpus foetidus*).

In view of its early coming, and notwithstanding its strong odor, which, by the way, does not persist like that of the skunk but readily washes off, it seems to me desirable to give the plant a name as appropriate as the one it bears and far less obnoxious. Therefore I suggest the name "Pioneer plants."—*J. Milford McKee, Mt. Vernon, N. Y.*

THE VENUS FLY-TRAP

By H. A. Rankin

IF your invitation in the last issue of the *Botanist* may be accepted by one who is merely a nature lover, I will be glad to make a few observations, and to present as Eastern North Carolina's most interesting plant Venus' fly-trap (*Dionaea muscipula*) which, Darwin in his "Insectivorous Plants" says is one of the most wonderful plants in the world and which he also says grows only in Eastern North Carolina, so that our section is the only one which may present it.

The savanna lands of this state are clothed with a profusion of flowers in great variety from the earliest spring flower, *Chaptalia tomentosa*, which I have found as early as February fifteenth, until the last of the grass of parnassus is killed by hard frosts as late as November fifteenth.

Where there are many flowers there are many insects and where there are many insects their enemies abound and here, taking their places among the birds, bats, frogs, lizards, and other enemies we find a group of insectivorous plants with wonderfully developed means of catching their prey.

One can easily find spots not larger than fifty feet square in which may be found *Drosera filiformis*, *D. rotundifolia*, or, it may be *D. longifolia*, *Sarracenia purpurea*, *S. flava*, *C. variolaris*, *Pingicula vulgaris*, and Venus' fly-trap.

An early morning walk may show you a slight depression where the dew seems heavier, and, more than elsewhere, the dew-covered webs glisten in the sun. Closer inspection will show that this is not all dew but that it is a bed of

D. filiformis with its tall spikes covered with sticky fluid and the webs were not spun by spiders but are of the same sticky fluid drawn by the swaying and touching of the leaves. One could hardly suppose that these webs would hold even a very small insect, but, the breaking web might easily assist in landing the victim against the plant, where it would be held fast by the viscid fluid.

The leaf of the pitcher plant (*D. purpurea*) being wide open is full of water, probably mostly rain water and its victimes are simply drowned. One insect has found a use for this little vessel of water and the leaves will usually be found to contain larvae of the mosquito. The trumpet leaves of *S. flava* and *S. variolaris*, being covered so that no rain water can get in them, have less juice, or water, in them and I have never found in them any wiggletails, or mosquito larva, but, even these are used as a breding place by at least two insects, the larvae of one at least sharing the catch with its host.

But far the most interesting of these insectivorous plants is Venus' fly-trap. It is very fascinating to touch the inside of the leaves and see them close, which they do just as one closes his hand over an object, and almost as quickly, and it is interesting to open the leaves and see the variety of insects caught. Beetles seem to be the chief victims, though small grasshoppers, crickets and spiders may be found and I have found one containing a small snail shell.

In the spring this plant sends up a scape from six to twelve inches high bearing a cluster of very pretty white flowers and around the base of this is a rosette of leaves, open, like mouths, or steel traps, and woe to the insect that slips from the flower above, or crawls into one of these traps. As soon as one of the small hairs inside the leaf is touched the jaws close with astonishing quickness, the long

stiff spines on the jaws interlock and form a cage from which only a very tiny insect can escape and which only the most powerful, if any, can open. Then, very deliberately, taking many hours, the jaws close tighter, forming at last a water tight compartment which holds the victim and the juices which destroy and devour it.

If a leaf closes from being touched by a straw, or, on anything which is not food, it will open again, taking several hours to do so, but, a good meal is apt to prove fatal to the leaf. Whether these insectivorous plants have any economic importance as insect destroyers or not, owing to the profusion of the plants the destruction is enormous.

ELEMENTARY SPECIES OF RUDBECKIA

By Willard N. Clute.

SEVERAL genera in the Compositae tend to vary considerably in the color-patterns of their flowers. In this connection there comes to mind the cultivated *Coreopsis* with rays marked with brownish-red, the cone-flower (*Lepachys columnaris*) which occasionally produces ray-flowers with brownish markings, the red sunflower, introduced to the trade some time ago, and last but by no means least, *Rudbeckia hirta* whose flower-heads have outdone all other Composites in the variety of their markings.

As the plant grows in our fields and meadows, the rays are a clear, deep yellow but it is not difficult to find plants with a flush of red on the rays. From a single individual of this kind, found in the wild, has sprung a race of pied individuals which are sufficiently distinct in themselves to be separated into several easily recognized strains.

The original plant, with a blotch of red at the base of each ray-flower, is known as *Rudbeckia hirta pulcherrima*. Another form with ray-flowers entirely red is *R. h. rubra*. Still others have reversed the color of the original, thus producing yellow rays tipped with red forming a sort of double halo around the disk. This is the form *R. h. annulata*. A form with quilled rays has been name *R. h. tubuliforme* and a partial albino with lemon-yellow flowers is *R. h. flavescens*. Double flowers have been found repeatedly but seem never to have been namd.

Still another form, with two distinct shades of yellow on its rays, has recently appeared. The deeper color, occupying the position of the red in the *pulcherrima* form is suspected of indicating a character for red which might be bred out if desired. In any case the form is best handled by name and it is here proposed to call it *Rudbeckia hirta dichrona*, in allusion to the two shades of color on its rays.

The longer one works with *Rudbeckia hirta*, the clearer it becomes that the botanical species consists of a large number of elementary forms. Some are nearly annual, dying soon after blooming, while others are biennials or even strong perennials. There is as much difference in the shape of the leaves as there is in the leaves of the much-described evening-primrose. Among the conspicuous forms is one with unusually luxuriant leaves, and flower-heads measuring up to four inches in diameter. The involucral bracts in this form are more than an inch long with spreading leafy tips. This is truly a gigantic form and may well be called *R. h. gigantea*.

NOTE *and* COMMENT

New Phlox for Rock Gardens.—*Phlox Procumbens Coerulea* is a tiny blue phlox that can boast of two well known hardy parents—*P. divaricata* and *P. repens.* It combines the features of both in a remarkable degreee. A clump of it has come through three winters in my New Jersey garden, perched on a rock with about 2 inches of soil. During the winter the rosettes of spatulate gray green leaves, scarcely an inch long, seem to be immune to the severest weather. By spring the flower stalk shoots up rather rapidly to 4 and 5 inches and gives rise to a cluster of the daintiest blue blooms similar to those of *divaricata* but with the yellow stamens showing clearly, giving the impression of a yellow eye. After flowering, side shoots develop, somewhat like the strawberry and the tips of these finally root and become separate individuals though still retaining a hold on the parent plant. A colony of these plants is quite a treasure and should, when known, become as popular as the Canadian blue phlox. Indeed it should be held in greater esteem as it is free from the two objectionable features that characterize the latter namely "legginess" and unsightliness after flowering. —*Roderick M. Crocket, Cranford, N. J.*

Nature-Knowledge Needed.—Nature-knowlege, whatever you call it, must be brought back into the home—and this ought to be through the kindergarten and the primary school. Teachers in these schools ought to be helped in high school to "know" the plants and birds and the common denizens and insects of field and forest. A high school

teacher of biology who cannot help the forming grade teachers to get this knowledge, really is not fitted for the place he holds; but college too rearely can or does fit him. I fear we must look for the beginnings of this knowledge where they lay several generations ago—among the self-helped and self-taught fathers and mothers to whom little children turn, at first, in the confidence that they know, or have, or will learn, or will get what is asked for whenever it is neither unreasonable nor harmful. My heart is very warm for the person groping for such self-help; and for the simple-minded apostle of real nature-knowledge who, in the complexity of our specializations and prerequisite requirements can not reasonably hope to get or hold a teacher's place, whatever he may know, unless he produce some sort of academic sealed and beribboned open-sessame. If ever we can get back to this common possession of our modestly educated forefathers —and the means of self-education are myriad now where they were very few for our ancestors—no college class will smile at the thought that it may contain a potential Hales, or Hofmeister, a Gray, a Mendel. Here in the class-room, even without laboratories, greenhouses, herbaria or gardens—lies our own personal point of contact with the relation of botany or of any science to agriculture—or to anything else. The inspiration of an enthusiastic teacher, an indefatigable investigator, an aging man who never can become encysted by age but whose horizon increases with the years, is the contribution of college and university that develop it. These are the men who make laboratories, who devise means to ends—whom others follow.—*Dr. William Trelease in Science.*

Snowballs and the Weather.—It is well known that cool weather disposes plants to accumulate sugar in their tissues and that this in some way influences the pigments in

flowers. During the past cool spring many flowers were noticeably deeper in color and some of those ordinarily white have developed anthocyanin and become a decided pink. This is true of the garden snowball tree whose sterile florets have in many cases taken on a rosy hue.

Exotic Trees in Forestry.—Whenever anybody thinks of reforesting a region, his attention turns as naturally to European trees as if these were the only ones available. It is a common human failing to distrust that with which we are familiar. Witness the kind of trees that we invariably use for cemetery planting; scarcely one per cent are of native origin although we have more kinds of trees in this country than are found in any other of like geographic position. Similarly our foresters are seldom content to work with native species but must ever experiment with European kinds. Among those in great favor are Norway spruce (*Picea excelsa*), Austrian pine (*P. austriaca*), Scotch pine (*P. sylvestris*) and European larch (*Larix Europea*) though none of them have proved to be better than our own species. There is some suspicion that the growing of foreign trees holds more of a lure for the experimentor than the cultivation of our native trees does though one would think that species adjusted to a region by more than three hundred centuries of growth would be better for the purpose than any others.

Clustered Cancer-root.—Indian pipes, beech-drops, and coral-root have been familiar plants for many years but only once has it been my good fortune to see pine-sap growing. Twice I have found colonies of squaw-root and a few stalks of one-flowered cancer-root. This year I discovered that the clustered or yellow cancer-root (*Orobanche fasciculata*) also lives in this locality. It was a real surprise to chance upon it on a near-by hill that has been explored in every season. The clump was as big as my fist and thirty

blossoms were counted while fully as many unopened flower-buds drooped beneath. Most of the crowded scaly stems sent up only two or three flowers. The stalks, bracts, peduncles, and calyx are a pale yellow and the corolla is white. *Fasciculata* has a two-lipped corolla but the five lobes do not spread. The *uniflora* flower with its spreading lobes is prettier. I did not dig the stranger up to find out what kind of roots it lived on as I wanted it to keep on living. On the 14th of June the parasite was mostly yellow and three days later it was all brown and dry and difficult to find among the weeds. Gray says it grows "on sandy ground, L. Michigan, Minn., southward and westward." That sounds as though it was away from home in Pennsylvania. Britton, too, says it is western species and Wood does not mention it.—*Nell McMurray, Clearfield, Pa.*

Galinsoga Still Traveling.—In many places in the North-eastern States may be found an insignificant and harmless weed known as *Galinsoga parviflora*. It is a composite with small white flower-heads and originally lived in Mexico but long since invaded a large part of the United States. The plant itself dies at the end of the growing season, but it always leaves sufficient progeny to continue the race and to supply colonists for any waste grounds into which it can push. According to Ralph R. Stewart, who has spent some years botanizing in Kashmir in North-west India, it is now found in that part of the world. He marks it as apparently indigenous but it is generally recognized as a native of tropical America.

Vanilla-leaf in Commerce.—Manufacturers of cigars have often been accused of sophisticating their products by a judicious mixture of cabbage and alfalfa, but these substances appear quite unnecessary in view of the other things that may go to the making of a "smoke." Glycerine, rum,

and licorice are among the ingredients which are depended upon to raise the cheap cigar to an equality with its 25-cent relative. To give a bouquet to the product, vanilla or its double, coumarin, is commonly used. According to a writer in *Torreya* the vanilla leaf (*Trilsia ordoratissima*), and perhaps *T. paniculata*, is also used to flavor cigars. The basal leaves of this plant, which contain coumarin, are gathered in parts of Georgia and sent to market in large quantities. In some years possibly a hundred tons of the leaves are gathered in three counties in the State mentioned.

Man-of-the earth.—Several species of the Convolvulaceae are known to produce enlarged roots, our cultivated sweet potato being a good example. The palm for the largest root is awarded to *Ipomoea pandurata* whose reputation in this respect is reflected in the common names of "man-root" and "man-of-the-earth." The roots are popularly assumed to attain the size of a man's body but nobody seems to have seen a root of this size. O. P. Medsger, who recently attempted to dig up a plant, reports in *Torreya* that it extended more than three feet into the soil and weighed more than fifteen pounds. He reports, also, that the bush morning-glory of the West has a still larger root and that roots of *I. Jalapa* of the Southern States reaches a weight of forty pounds. In parts of the Middle West the man-of-the-earth is fairly abundant often growing in thickets and climbing the surrounding vegetation where it opens its hundreds of large cream-colored, purple-throated corollas to the gaze of the traveler.

Feather Hyacinth.—In old-fashioned gardens one occasionally comes upon a curious plant with hyacinth-like leaves and a spike of very fine-cut slender filaments which produce the effect of a purple plume nearly a foot long. It is impossible to trace this remarkable specimen by means of

a key for it is a monstrous form in which all parts of the inflorescence are turned to slender objects like stamen-filaments. The only way to identify it is to ask somebody who knows, and accordingly we turned to Dr. L. H. Bailey, author of the "Manual of Cultivated Plants." He identifies it as the feather hyacinth (*Muscari comosum monstrosum*), a relative of our common little grape hyacinth (*Muscari botryoides*). It is sometimes called *M. comosum plumosum* in catalogues. It seems to be rare in cultivation but it is well worth a place in the garden. If any of our readers have this form under cultivation, we would be glad to hear of it.

Scarlet Ipomopsis.—This is an old-fashioned flower that one rarely sees now, even in old-time gardens. It is highly decorative, its rich scarlet flowers combining wonderfully with larkspurs. It comes into bloom at the same time as the larkspur and blooms until cut down by frost. If one wishes a patriotic effect these are the flowers that will produce it: one packet each of scarlet ipomosis, blue, and white larkspurs. Sow the ipomosis at the back as it is tallest. The seedsmen still list the ipomosis under the common name of "tree cypress." In Florida it grows on the small sand-hills along the beach on the ocean side. Here it grows more than three feet high and is found by the acre—a solid scarlet sheet almost like a glowing sunset. It self-sows readily and hence is really a desirable plant for the garden, but like many others it has been forgotten. No plant of recent introduction can equal it in my estimation. The fact that it will bloom luxuriantly in poor sandy soil is much in its favor.—*Mrs. B. A. Budd, Prescott, Ariz.*

Blooming of Melanthium.—Miss Julia J. Noll, Plainfield, New Jersey writes: "We have within a short distance of our city, two species of *Melanthium*—*M. Virginicum* and *M. latifolium*. The first is found growing in a swamp and

flowers each year; the second is found in woods but I have seldom found the flowers. One year I will find many withered stalks with seed-pods but on visiting the same place the following year at the time when blossoms are due, I find plants but no sign of bud or blossom. I always find plants, however. Can anyone tell me whether this species blossoms intermittently or does it die after it has blossomed and the plants found the second year are young plants."

Accent of Common Names.—Writing of the proper pronunciation of arbutus, Robert A. Benton says: "The stress in the Latin word, of course, falls on the first syllable as is shown by this verse out of Vergil *'Dulce satis humor depulsis arbutus haedis'*—'Full sweet the dew (full sweet) the arbutus to the weaned kids.' The arbutus in Italy is a tree quite commonly met with having a fruit like a strawberry that may be food for more tender creatures. Its leaves and twigs are pleasing to goats. Bailey, in "Field, Forest and Garden Botany" gives the classical pronunciation but the "Standard Dictionary" (1895) gives that only for the arbutus tree or shrub and makes the accent fall on the second syllable for *Epigaea repens*—trailing arbu-tus. When names are adopted into the English out of other languages it is clearly allowable to fix the form and pronunciation to suit the genius of the language. We do this with many bible names and with many names taken from Greek and Latin; for example, Philip, Socrates, Pompey and many others; also with modern names as Antwerp, Leghorn, Naples, Brussels, etc. If this is allowable with historical and geographical names, why not with botanical ones?" And J. M. Bates adds: "It should be made as plain as plain can be that the common names of plants do not have to conform to the pronunciation of the Latin names. These matters cannot be forced and there is no reason why they should be. For in-

stance, *Anemo-ne* in Latin becomes anem-one in English. *Fushsia* (Fewksia) in Latin becomes fushia in English. The great common people have their rights."

More Common Names.—There can be little doubt that common names are constantly in the making. Aside from the "English" names which are usually mere translations of the technical terms, new names are frequently made for no other reason than that the maker calls the plants by the most significant title he can think of. Among such are "feather-plant" applied to *Rhus cotinoides* which is otherwise commonly known as "smoke-plant." The pond lily or spatter-dock (*Nymphaea advena*) in Northern Pennsylvania is occasionally known as "yellow lanterns." *Eurphorbia heterophylla* usually known as "painted leaf" is also called "Mexican Fire Plant," "fire-on-the-mountain" and "hypocrite-plant." "A correspondent in New York asks for the identity of "Helen-by-the-walk." This may be a variant of "lady-by-the-gate" in which case it is *Saponaria officinalis*. If this is not the correct identification, we should be glad to be corrected.

The Mouse Plague.—After the insects, the mice are probably the most destructive animals with which the gardener has to reckon. Though small they are far from insignificant. The meadow mouse, especially, does an immense amount of damage annually, eating the bark from newly planted trees and shrubs, destroying whole fields of clover and alfalfa and taking heavy toll from nearly every other farm and garden crop. Although it is preyed upon by coyotes, wildcats, badgers, skunks, weasels, hawks, owls, ravens, crows, magpies, shrikes and even gulls and herons, its remarkable fertility enables it to keep its ranks full with some to spare and a mouse plague, such has frequently devastated parts of the West seems ever just around the corner. Ac-

cording to an article by Vernon Bailey in *Journal of Agricultural Research*, the meadow mouse begins to breed when but twenty-five days old and may produce from thirteen to eighteen families within a year, each family consisting of from four to nine individuals. If all the young should breed and none should die, it is estimated that the descendants of a single pair might number more than a million in a year. It is doubtful if man could carry on his cultivation of the soil without the aid of the birds and other animals that prey on the mice. However mice may have their uses. Seton has called them "the boats designed to bring over food from the mainland of grass to the island of carnivores."

Resistant Chestnuts.—The chestnut tree, one of the most interesting and valuable in the American forest, is practically extinct in the Northern and Eastern States. This has been caused by a virulent plant disease, the chestnut blight, whose microscopic spores, blown about in vast quantities, have sought out the chestnuts, wherever growing, and in spite of all man's efforts have killed the trees. In many places the forest is heavily depleted, the trees still standing but brown and dead. The blight, however, seems often to have killed only the aerial parts and there is a fine growth of sprouts from the roots, in some cases more than ten feet high. Whether the blight will return and ultimately kill this new growth, or whether an occasional plant will prove resistent enough to triumph over the blight and supply material for reforesting the country remains to be seen. In the Susquehanna Valley of southern New York the writer was surprised and pleased to find a single tree as fresh and green as ever, standing in full bloom in the midst of the surrounding desolation. The case of the chestnut emphasizes the danger to American plants of introducing foreign species. The blight undoubtedly came from imported Japanese chest-

nut trees, which latter, though not entirely immune to the disease, are rarely killed by it.

Conspicuous Flower Color.—During the blooming season any locality has numerous flowers in bloom but it nearly always happens that one or more are so bright, or so abundant, or so inclined to grow in dense colonies that they give the color-tone to the locality. Flowers of this nature are the mountain laurel, the azalea, the rhododendron, the ox-eye daisy, and the buttercup. As the season advances and flowers multiply, it requires special abilities for a single species to take the landscape in this way. The flowers usually manage it by growing in immense numbers in a favorable area. In July, an unidentified vetch with close clusters of deep lavender-blue flowers was the most conspicuous species in Quebec and northern New York. In the Hudson valley the blue devil (*Echium*) and the orange hawkweed or devil's paintbrush (*Hieracium*) by turns lit up the countryside, but across southern New York the Canada thistle appeared as a most decorative plant. The rains and cold weather had deepened the color of its blossoms to a clear lavender and the thick-set colonies in the meadows and along fence-rows made pleasant spots of color. On stony hillsides and "hog-backs" as the sharp ridges of glacial drift are called, the blue of the creeping bell-flower, (*Campanula rapunculoides*) was conspicuous and in an occasional swamp the deep magenta blossoms of *Lythrum salicaria* made a new note of color. Across the sand hills of northern Indiana the butterfly weed was the dominant plant and as the rich black soil of the Illinois prairies was reached the button snakeroot (*Liatris*) made many acres rosy with its myriad spikes.

Prunella vulgaris nana.—More than twenty years ago, the writer gave the name of *Prunella vulgaris nana* to a form of the common blue curls which instead of growing

erect, as the species always does, lies close to the earth, roots at every joint, and produces small heads of flowers that are low enough to escape the lawn-mower. There has always been a suspicion that this is a sort of artificial species—a form assumed to escape the inventions of mankind—but the fact remains that for more than a quarter of a century it has maintained its creeping habit and the peculiar character of rooting at the joints. It has been slowly spreading and now ranges over a considerable territory. It has been reported from Connecticut and Massachusetts and the writer has recently seen it in Montreal, Binghamton, N. Y. and Eaglesmere, Pa. The plant grows almost exclusively on lawns forming dense little mats that smother the grasses. It would be interesting to know how many others have found it. The makers of the manuals have thus far neglected to mention its occurrence. Perhaps they are waiting for somebody to describe it in sounding Latin phrases.

High-Bush Cranberry.—Did you ever taste the high-bush cranberry? If you did, it is likely that you received an unexpected shock for instead of the sour cranberry taste you anticipated you found the berries to be intensely bitter and nauseous; that is, if you tasted the fruits of the plant commonly cultivated. It seems that the plant of our gardens and shrubberies is the European variety *Viburnum opulus* whose sterile offspring is the snowball tree or guelder rose so common in cultivation. But there is a real cranberry tree, according to George Darrow in the *Journal of Heredity* and that plant is the one that up to the present has been known as *Viburnum opulus* variety *Americanus*. It is strange that this species which circles the globe in the North Temperate zone should be bitter on one side of the earth and sour on the other. Anyway, it seems the part of good sense to plant our own form since it is quite as hardy as the other

and its fruit can be used for pies and sauces. If not used, the fruits hang on the bushes through the winter, lighting up the landscape and affording food for the winter birds.

Dandelion Distribution.—Everybody knows that the seeds of the dandelion are distributed by the wind but it may be news to many that man often effectually raises the wind for this vegetable pest. In many places dandelions grow in solid colonies along the railroads and at the proper season the air currents created by fast moving trains whirl the seeds high in the air and scatter them over the adjacent farm lands. Often the seeds are picked up in such numbers as to obscure the view from the rear of the train, making what to all appearances is a summer snow-storm.

Radish Ties a Knot.—Mr. C. W. G. Eifrig recently discovered in a bed of the common white radish, a specimen which appears to have attempted gymnastics by tying itself into an exact overhand knot. As the root grew in size a deep constriction was made around it where the knot was made, but this did not prevent all the rest of the root from increasing to the usual size.

Death of Martin C. Ebel.—Just as this magazine goes to press, we learn with deep regret of the death of Martin C. Ebel at his home in Summit, N. J. Mr. Ebel was editor of *Gardener's Chronicle of America*, and Secretary of the National Association of Gardeners. He had a wide acquaintance among lovers of gardens, was untiring in advancing the interests of the Association he represented and his passing will be a serious loss to horticulture.

EDITORIAL

If you want a measure of how much one can forget, look through the last volume of this magazine and see how much it contains that is again new to you. All this, however, is not entirely a matter of forgetting. A great many impressions pass through our brains without making a permanent record, simply because we are not ready for them at the time. As we progress in knowledge, these forgotten facts assume new relationships to the others and a review of them makes them our own. It is likely that a re-reading of the books we have read and enjoyed would prove almost as satisfactory as the reading of an equal number of new ones. A vast number of books on out-door subjects have been issued in the past quarter of a century and one wonders whether it would not be as well to re-issue the best of these as to issue absolutely new ones. The authors simply vary; the subject-matter does not. In a similar way a re-reading of the back numbers of this magazine can scarcely fail to interest the plant student. The matter they contain is of permanent value. This suggests that those who have nearly complete sets should begin to think about getting the missing numbers. We have only about twenty full sets left and very few odd volumes. In many cases we have not a single extra number on hand. Two large institutions each lack a single number to complete their sets. These numbers are Volume 27, number 2 and Volume 20, number 1. If any reader has an extra copy of these to spare we shall be glad to pass them along to the waiting librarians.

Recent subscribers who find bills in this issue, may be puzzled to observe that we have two different rates of subscription. In explanation it may be said that annual subscribers pay a higher rate because the expense of attracting them to the magazine and taking care of them afterwards it greater. Many annual subscribers are strictly transient, changing from one publication to another each year, but the majority, finding our magazine to their liking, remain and ultimately join the permanent list. By paying for two years in advance at the reduced rate, they secure this rate annually as long as they remain subscribers. We are always glad to get more annual subscribers—they are the ones who later swell our permanent list—but we always hope that they will become permanently interested in the magazine and join us in advancing a knowledge of botany.

BOOKS AND WRITERS

Although it may be unethical, we purpose saying a few words in favor of our contemporaries! * * * *Horticulture* of Boston, formerly published as a trade journal but now the official organ of the Massachusetts Horticultural Society, is steadily growing in usefulness. * * * Unlike the other gardening magazines, it does not devote most of its space to directions for growing common garden-crops. * * * Each issue is likely to tell you something you didn't know before! * * * We incline to think that all who like the *American Botanist* would like this also. * * * *Fruit, Garden and Home* has changed its name to *Better Homes and Gardens.* * * * Although only two years old it claims nearly 500,000 subscribers. * * * Matter to interest so large a circle must of course be more general in nature than that of the strictly botanical publications

* * * *Park's Floral Magazine* claims about the same number of readers. * * * It all depends on whether one wants accounts of experiences with common garden flowers or the latest information on the progress of botany. * * * Publications purveying the latter kind of literature will never be able to boast of even 100,000 readers. * * *One-tenth of that number would be a big list. * * * *Florida Fruits and Flowers* has begun publication at Bartow. * * * At present it features largely the commercial side of plant growing, but every little helps to increase the interest in plant life. * * * The Cincinnati Chapter of the Wild-flower Protection Society has issued three numbers of a small journal devoted to plant preservation. * * * It is named *Wildflower* and is designed for circulation among members of the Society but others should find it interesting. * * * It costs fifty cents a year, we hear. * * * The Federal Horticultural Board has ruled that bulbs of narcissus, scilla, chionodoxa, and various others shall not be imported into the United States after 1925. * * * The Board does not excuse its action on the ground that such importation may bring diseases into the country. * * * It simply refuses to allow them to come in. * * * We sometimes wonder why it is necessary to enact tariff laws when five gentlemen in Washington are able to tell the other 112,000,000 of us what we can and cannot import. * * * Probably this is the reason the Reviewer will not vote for the candidates of a party that fosters such arbitrary rulings. * * * The gardener's vote ought to defeat the party! * * * The "Who's Who" books by Beecroft have been out of print for some time but the two volumes on ferns and flowers, respectively, are now to be had bound in a single volume. * * * Wilson Popenoe has recently issued "Economic Fruit-bearing Plants of Equador." * * * Our com-

mon wild black cherry becomes an important fruit in that part of the world. * * * But it is so much enlarged and otherwise changed that many think it a separate species. * * * The Georgians have about decided not to believe in evolution. * * * They insist they are made out of dust. * * * Well, maybe they are! * * * It ought not to be hard, however, to believe that man and monkeys are related when we see so many legislators making monkeys of themselves. * * * The "Save the Redwoods Lague" has dedicated another grove of the giant redwood. * * * This one commemorates Franklin K. Lane. * * * California has started out to protect the yucca. * * * It is now unlawful to pick the blossoms of this desert denizen. * * * The legislators say that picking the blossoms causes the plant to die * * * If they knew as much about botany as we hope they do about law they would know that the yucca dies after blooming, anyway. * * * But it is just as well to let those yuccas grow. * * * They provide food for the sheep and goats that roam the desert. * * * And what is a tourist compared to a goat?

Gebruder Bortrager of Berlin have issued a small volume on plant pathology under the title of "Einforthrung in die Pflanzenpthologie" by H. Morstatt which is designed as a textbook for farmers, gardeners and foresters. It contains 150 pages and gives a general account of plant diseases and the organisms that cause them. It is well printed but of course it is in the German language and therefore unavailable to many on this side of the world. It is bound in boards and costs 75 cents.

Messrs Urban & Schwarzenberg of Berlin and Vienna are issuing in parts a most ambitious work in German entitled "Handbuch der Biologischen Arbeitsmetoden" under the editorship of Dr. Emil Abderhalden. This will discuss

minutely all phases of plant study. There are to be more than a dozen volumes divided into many "teils," "hefts" and "lieferungs," each written by acknowledged authorities in their special fields. These are appearing as fast as ready. The latest is lieferung 135 entitled "Pflanzenuntersuchungen" consisting of sections by Hans Winkler on methods of grafting and related matters and by Bohumil Nemec on regeneration in plants. It is perhaps needless to say that the parts that have thus far appeared are characterized by the painstaking thoroughness for which the Germans are famous. The parts are well illustrated and well printed and will undoubtedly be of value to students of plants who are familiar with German. The parts are bound in paper and range in price from 3 to 6 Swiss Francs.

James Berthold Berry's "Farm Woodlands" with its accompanying flock of tree manuals forms an unique enterprise in the realms of forest literature. The book is designated as a textbook for schools and colleges and a handbook for practical farmers and we are inclined to think that both groups will find much of value in it. The author's principal theme is the organization of the woodland in such a way that a maximum amount of wood or other products will be derived from it and his book is a complete guide to such practices in this country. The twenty-three chapters bristle with facts; indeed it would be difficult to find a phase of forestry that the author has not touched upon. Nor do all these subjects pertain to the production of timber or fuel. Among other topics selected at random from the book are the influence of forests on rainfall and water-power, the forest regions of the world, the wood using industries, seasoning lumber, tree nurseries, wood preservation, care of shade-trees, maple products, and basket willows. More than 150 illustrations mostly from the U. S. Forest Service add

interest to the text. Each chapter ends with a list of references to which readers may turn for additional information. The woodland volume does not discuss the individual species which make up the forest but this is provided for by three additional volumes devoted respectively to "Northern Woodlot Trees," "Southern Woodland Trees" and "Western Forest Trees." One therefore adds to the forestry book the tree manual or manuals that refer to his region. In the manuals adequate keys are given for identifying the trees, and these are helped out by good line drawings of the leaves and other characteristic parts of each species. The trees are also described under the heads form, occurance, distinctive characteristics, wood, and uses. The paragraphs on distinctive characteristics are especially helpful. In case where certain species occur in more than one of the regions selected, the descriptions are found in the book relating to each region making each manual complete in itself. The price of "Farm Woodlands" is $2.00 and that of the manuals is $1.20 each. All are published by the World Book Company of Yonkers, N. Y.

A most compendious account of the life-processes of the higher forms of vegetation, is the volume by MacGregor Skene of the University of Aberdeen on the "Biology of Flowering Plants." This is one of a series of "Biological Text-books," under the general editorship of J. Arthur Thompson, which is being issued by the Macmillan company. The volume merely attempts to describe the activities of the seed-plants and though it contains but six chapters, runs to more than 500 pages and required the consulting of more than a thousand volumes. Most of these are listed in the bibliography at the end of the book. The six chapters deal with the absorption of water and salts, assimilation and transpiration, special modes of nutrition, protection, repro-

duction and dispersal, and development. In these the author seems to have touched on everything germane to the subject. The volume, therefore, goes much farther afield than the usual text and impresses one as being quite up to date. The author reinforces his own opinions by frequent references to the investigations of others; in fact, he appears over particular in this respect, though it may be permissible in outlining the historical development of the subject. The volume is illustrated by eight plates and numerous drawings in the text. It suggests in many ways the old "Gray's Botanical Text-books" and the work is carried out with the same thoroughness that characterized the earlier volumes. The Price is $6.00.

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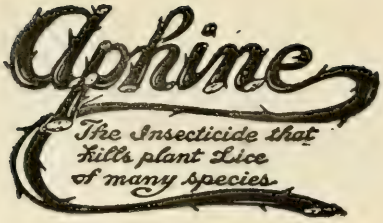

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